The development of hope at the workplace

Thesis

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Abstract

The dissertation project "Development of hope at the workplace" has investigated how the character strength hope develops in a workplace context, and how hope relates to the desirable outcomes of mental health and performance. A theory about environmental conditions favorable for the development of hope was created by combining the existing theory of hope with self-determination theory. This newly developed general theoretical framework was broadened for the application to the vocational training within enterprises and tested in three empirical studies.

The first study developed the fundamental theoretical framework and tested the basic hypotheses about the relation of hope with the satisfaction of basic psychological needs (relatedness, autonomy, and competence) in the work environment. The cross-sectional questionnaire data integrated the perspectives of trainees, groups of trainees and trainers. Using multilevel modeling, the hypothesized positive relationship between hope and the satisfaction of three basic psychological needs in the work environment was supported.

The second study examined the development of hope and the reciprocal influences between individuals' hope and the satisfaction of their basic psychological needs during three years. The longitudinal questionnaire data were tested with autoregressive cross-lagged latent models and provided evidence for a positive reciprocal feedback process between the satisfaction of the need for competency and hope. The one year lagged effects between hope and the needs for autonomy and relatedness were not or only marginally statistically significant, but synchronous relations did exist.

The third study tested a theoretical resource model of positive reciprocal relationships among hope, general mental health and performance at the workplace. Based on longitudinal questionnaire data, the hypothesized positive reciprocal

influences among hope, mental health, and performance were examined over 24 months. The longitudinal model as a whole suggested a positive effect of hope on performance and a positive effect of performance on mental health, but no long term direct effect of hope on mental health.

After situating the present dissertation in the existing research the three studies are reported.

To conclude the findings of the three studies are integrated and discussed in regard to the theoretical, empirical, and practical implications.

Zusammenfassung

Die Dissertation "Entwicklung von Hoffnung im Arbeitsumfeld" hat untersucht wie sich die Charakterstärke Hoffnung im Kontext der Arbeit entwickelt, und wie Hoffnung mit mentaler Gesundheit und Leistung zusammenhängt. Eine Theorie über hoffnungsfördernde Umweltbedingungen wurde entwickelt. Dieser neu entwickelte theoretische Rahmen, basierend auf der Verbindung der existierenden Theorien der Hoffnung und der Selbstbestimmung, wurde speziell auf den Kontext der betrieblichen Berufsausbildung ausgeweitet und in drei Studien empirisch geprüft. Die erste Studie entwickelte die fundamentalen theoretischen Grundlagen und testete die grundsätzlichen Hypothesen über den Zusammenhang zwischen Hoffnung und der Befriedigung der drei psychischen Grundbedürfnisse (Autonomie, Kompetenz und Verbundenheit). Die Querschnittsfragebogendaten umfassten die Perspektive von Lehrlingen, Gruppen von Lehrlingen und Ausbildenden. Die Mehrebenenanalysen unterstützten die postulierte positive Beziehung zwischen Hoffnung und den drei psychischen Grundbedürfnissen im Arbeitsumfeld.

Die zweite Studie untersuchte die Entwicklung von Hoffnung und die reziproken Einflüsse zwischen der Hoffnung von Individuen und der Befriedigung derer psychischen Grundbedürfnisse über den Zeitraum von drei Jahren. Die mit autoregressiven ‚cross lagged' latenten Modellen ausgewerteten longitudinalen Fragebogendaten lieferten Hinweise für eine positive Wechselwirkung zwischen Hoffnung und dem Grundbedürfnis für Kompetenz. Die reziproken Effekte zwischen Hoffnung und den Grundbedürfnissen Autonomie und Verbundenheit waren über das untersuchte Zeitfenster von einem Jahr hinweg nicht oder marginal statistisch signifikant, jedoch waren synchrone Beziehungen vorhanden.

Die dritte Studie testete ein theoretisches Ressourcenmodell mit positiven reziproken Beziehungen zwischen Hoffnung, mentaler Gesundheit, und Leistung im

Arbeitsumfeld. Basierend auf longitudinalen Fragebogendaten wurden die reziproken positiven Beziehungen über eine Zeitspanne von 24 Monaten getestet.

Das longitudinale Modell als Ganzes deutete auf positive Effekte von Hoffnung auf Leistung und einen positiven Einfluss von Leistung auf mentale Gesundheit hin. Die direkten reziproken Effekte zwischen mentaler Gesundheit und Hoffnung konnten über den Zeitraum von einem Jahr nicht gefunden werden.

Nach der Einführung der drei Studien und der Situierung in der aktuellen Forschung werden die drei Studien vorgestellt.

Abschliessend werden die Resultate integriert und die theoretischen, empirischen, und praktischen Implikationen diskutiert.

Introduction

Short Overview of the Dissertation

The subject and the main research questions are introduced in the introducing chapter. The manuscripts of the three studies forming the dissertation are reported in the three following chapters and in the final chapter the results of the three studies are integrated in a general discussion.

Embedding of the Dissertation in the Broader Research

This dissertation investigates the development of trainees in their work environment. Maslow (1954) sparked research in human potential by raising the question why few people function at optimal levels and called people who were maximally healthy and superior in attainment of capacity self-actualized (Sumerlin, 1997). The humanistic research has recently been joined by research about positive organizational scholarship (Cameron, Dutton, & Quinn, 2003) and research about positive organizational behaviour (Luthans, 2002), which were inspired to apply the ideas of the movement of positive psychology to the workplace (Seligman and Csikszentmihalyi, 2000). Positive organizational scholarship (POS) is defined as the scientific, theoretically derived, and rigorous investigation of that which is positive, flourishing, and life-giving in organizations (Cameron & Caza, 2004) and is concerned primarily with the study of especially positive outcomes, processes, and attributes of organizations and seeks to understand what represents and approaches the best of the human condition.

This macro-level perspective is complemented by the more micro-level perspective of positive organizational behavior (POB) defined as "the study and application of positively-oriented human resource strengths and psychological capacities that can be measured, developed, and effectively managed for

performance improvement in today's workplace" (Luthans, 2002, p. 59). Bakker and Schaufeli (2008) have discussed the specific contributions and the overlap of POS and POB. They see POB primarily concerned with individual psychological states and human strengths that influence employee performance (Luthans, 2002), whereas POS is largely concerned with the positive aspects of the organizational context that influence employee's thriving (Cameron, 2005).

The major development in the field of POS has been the construct psychological capital (Luthans & Youssef, 2004). In order to clarify positive psychological behaviour five criteria for the inclusion of psychological constructs were defined. So far the four constructs that met these inclusion criteria to be considered as positive psychological behaviour are hope, resilience, optimism, and self-efficacy. The combination of these constructs has been termed psychological capital or PsyCap (Luthans et al., 2007). Stajkovic (2006) has theoretically proposed core confidence as a higher order construct for the same combination of constructs and raised numerous important questions regarding the factorial structure and the relationship of the construct with outcomes.

The POB research has laid a solid groundwork in for the research of strengths in the context of organizations. In research practice POS and POB are combined quite often. Cameron and Caza (2004) define the meaning of positiveness in POS with references to elevating processes, excellence, human strength, resilience, vitality, and meaningfulness. PsyCap is the higher order construct of positively oriented human resource strengths (Luthans et al., 2007). POS could therefore be understood as a broader definition of a research field which contains POB as a more narrow research area, which in less than a decade has managed to refine and backup its initial theoretical framework with precise definitions of objects of measurements,

the necessary corresponding empirical research and formulation of practical applications and interventions.

However by putting a strong focus on performance improvement as an outcome in the definition of POB takes a rather utilitarian approach. POB therefore seems to take a similar route the research about job satisfaction took in its beginnings, when it seemed to be stimulated by a desire to show that job satisfaction is important because it influences productivity (Lawler, 1994). According to Lawler the underlying conviction was "happy workers are productive workers" (p. 80). Lawler (1994) points out that "recently many organizational psychologists seem to be studying job satisfaction simply because they are interested in finding its causes". According to Lawler this approach was congruent with the increased prominence of humanistic psychology and the rising concern of society about the affective quality of work life. Therefore job satisfaction is an indicator of quality of life and worth understanding and increasing even if it does not relate to performance.

Bakker and Schaufeli (2008) display a wish for a similar development in regard to research about POB when they mention the arguments of Wright (2003) that the mission of POB must also include the pursuit of employee happiness and health as viable goals in themselves and Zwetsloot and Pot (2004) that employee health and well-being is becoming a business value of strategic importance and should be incorporated into a positive business value model of employee health and well-being. Meyer and Gagné (2008) emphasize that the well-being of employees is important in its own right, but they also point out the directly economically measurable benefits for organizations in terms of lower absence rates and health insurance costs.

Therefore in the current dissertation not only performance, but also mental health outcomes of hope are taken into account to do a truly humanistic psychology

justice. In the same time the performance demands are a reality of the global economy and fortunately most POS and POB research does also provide support for decision makers which are mainly interested in increasing performance.

Hope – a Psychological Construct

The psychological construct hope (Snyder, 2000) is a cognitive motivational construct, which reflects the subjectively perceived capability of finding solutions to problems, overcome hindrances and the general motivation to reach goals. Hope has been linked to various positive outcomes such as mental and physical health (Snyder, 2002), satisfaction in life (Park, Peterson, & Seligman, 2004), self-actualization (Sumerlin, 1997), and academic and athletic performance (Curry, Snyder, Cook, Ruby, & Rehm, 1997). Hope helps people to deal with stressors and function more effectively. Research on hope has been amongst the initial research areas, which came to be included under the umbrella of positive psychology (Seligman & Csikszentmihalyi, 2000; Snyder & Lopez, 2009). Peterson and Seligman's (2004) inclusion of hope in their conceptualization of a set of 24 fundamental human character strengths, as measured by their Values in Action Inventory of Strengths, has further spread the use of the construct in research and practice.

Broadening an Established Theory - the Development of Hope

Snyder (1994, 2000, 2002) has extensively described a theoretical process of development of hope and demonstrated numerous ways of raising hope in various domains of life (psychotherapy, education, health, work, etc.), and in diverse samples (children, elderly, athletes, students, etc.). Snyder (2000) has also formulated a developmental theory, which describes how hope evolves in young childhood and develops further through adulthood.

In the theoretical parts of Study 1 and 2 Snyder's theoretical suggestions about the development of hope were extended by drawing on self-determination theory. Self-determination theory is particularly suited to expand hope theory, because it is a macro-theory of motivation, personality, and optimal functioning (Deci & Vansteenkiste, 2004). Self-determination theory has formulated a detailed theoretical and empirical research body on the social-contextual conditions that foster positive human potential, natural processes of self-motivation, and healthy psychological development (Ryan & Deci, 2000). According to self-determination theory humans have three innate basic psychological needs: competence, autonomy, and relatedness. The satisfaction of these needs leads to enhanced self-motivation and mental health, and when the needs are not satisfied the result are diminished motivation and reduced well-being.

The present dissertation discussed and investigated how these social-contextual conditions relate to the development of hope. The main hypothesis was that the basic psychological needs (Deci & Ryan, 1985) –autonomy, competence, and relatedness– are also essential for the nurturing of hope.

In an initial study the present dissertation examined if these environmental factors are indeed related to hope. Study 1 compared different sources of information about the environment with individual hope levels. The next step was to extend on the results of the first cross-sectional study and to examine if the satisfaction of the psychological needs is related to the development of hope. Therefore, in Study 2 a longitudinal perspective was adopted to examine the impact of the environment on the development of hope over time, and the relation between levels of hope and later environments.

Broadening an Established Theory – Motives to Hope

In the theoretical discussions of the studies 1 and 2 another aspect of self-determination theory that can substantially broaden hope theory was highlighted: autonomous motivation. Self-determination theory addresses why people pursue goals and how they identify themselves with goals, the cognitive component that anchors hope theory (Snyder, 2002). Hope theory focuses on the *how* of goal pursuit, but does not explicitly address the motives for goal pursuit. Nevertheless, the reasons *why* a goal is pursued are an essential part of human action and probably also play an important role in hopeful thinking. Self-determination theory (Deci & Ryan, 1985) shows that characteristics of environments –notably the satisfaction of basic psychological needs– can lead individuals to integrate external demands, adopt them as personal goals, and thus develop an autonomous motivation.

Throughout live people are confronted with external demands. An initial step of hopeful thinking is to adopt these goals. Furthermore, if people value goals strongly, and identify themselves more with the goals, they are likely more agentic in pursuing them. Thus, the nature of goals would impact hopeful thinking. Although these theoretical considerations are not empirically examined in this dissertation, the relation of hope and autonomous motivation is an important part of the theoretical integration, and is discussed more thoroughly in studies 1 and 2. Particularly when applying hope theory to the work place or other applied settings with external demands, a theory which helps understand why and how people adopt goals can broaden hope theory substantially and address a crucial component of hopeful thinking: *what* do people hope for, and *why* do they hope for it?

The more profound analysis of people's goals would also allow a deeper integration with some other character strengths (Peterson & Seligman, 2004), because character strengths (e.g., bravery, citizenship, fairness, forgiveness, integrity,

leadership, love, modesty, or spirituality) should relate to the goals people choose. Hope on the other hand enables people to choose ambitious goals and to grow beyond the present personal and environmental limitations.

Broadening an Established Theory – Interactions between Cognition and Emotion

This theoretical discussion of the interaction of cognition and emotion shall provide a deeper insight in the process of hopeful thinking, for which the empirical articles did not provide enough room. Hope theories can be grouped into the emotion-based or cognition-based category and while various theories have been discussed in detail (Snyder, Lopez, & Pedrotti, 2010), the present discussion focuses on the integration of Snyder (2000) with Pekrun, Elliot and Maier (2009). After briefly summarizing the basic views ot the two theories, the similarities and differences are discussed, in order to conclude with an integration and some suggestions for future development in hope theory.

Hope- Cognition or Emotion? Two Theories

Hope Theory. Hope is defined as "the process of thinking about one's goals, along with the motivation to move toward those goals (agency), and the ways to achieve those goals (pathways)" (Snyder, 1995, p. 355). As such, hopeful thinking is goal-directed (Snyder, 2002) toward goals that are personally valued (Snyder et al., 1991). Snyder et al.'s Hope Theory conceptualizes hope as anchored in cognition and thus the whole theory has a strong cognitive orientation. Hope is not seen as an emotion, but rather as a dynamic cognitive motivational system (Snyder et al., 1991). However, Hope theory has a process model in which emotions are included and even play two crucial roles (see Figure 1). Individuals constantly monitor their progress in goal-attainment by comparing the perceived actual state of affairs with the aspired

goal. The target-performance comparison creates valuable feedback in the form of positive or negative emotions. Furthermore, the accumulation of such emotional feedback results in trait-like emotional sets, which accompany hopeful thinking and cast an affective tone on the goal pursuit process in general (Snyder, 2002). Because of this learning history individuals have an initial emotional mood set, which sets the tone of confidence when entering a situation. The situational positive or negative emotional feedback in turn also influences the emotional mood set and regulates behavior, as well as the two components of hope: agency and pathways thinking.

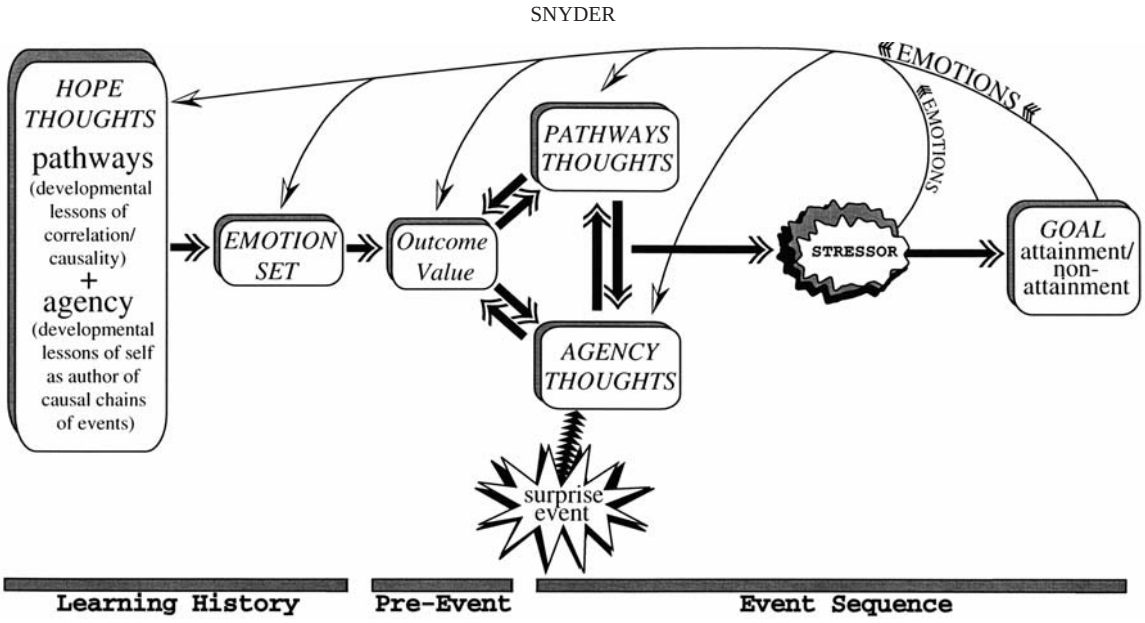

Figure 1. Schematic of feed-forward and feedback functions involving agency and pathway goal-directed thoughts in hope theory from Snyder (2002)

The Theory of Achievement Goals and Achievement Emotions. In contrast and unrelated to Snyder's conceptualization of hope as a cognitive motivational construct, Pekrun, et al. (2009) focus on hope and hopelessness as emotions. They developed a model in which achievement goals influence students' achievement emotions, which in turn predict academic performance (see Figure 2). Hope and hopelessness are conceptualized as two of several achievement emotions (sample item for hope: "I feel confident when studying", sample item for hopelessness: "I feel hopeless when I think about studying"). In the sequencing of their model these hopeful (and hopelessness) emotions are a result of the characteristics of goals. The achievement emotion hope is predicted positively by mastery goals, and performance-approach goals, and negatively by performance-avoidance goals. The achievement emotion hopelessness is positively associated with performance-avoidance goals and negatively associated with mastery goals. In turn hopeful emotions are related to higher performance, whereas hopelessness emotions are related to lower performance.

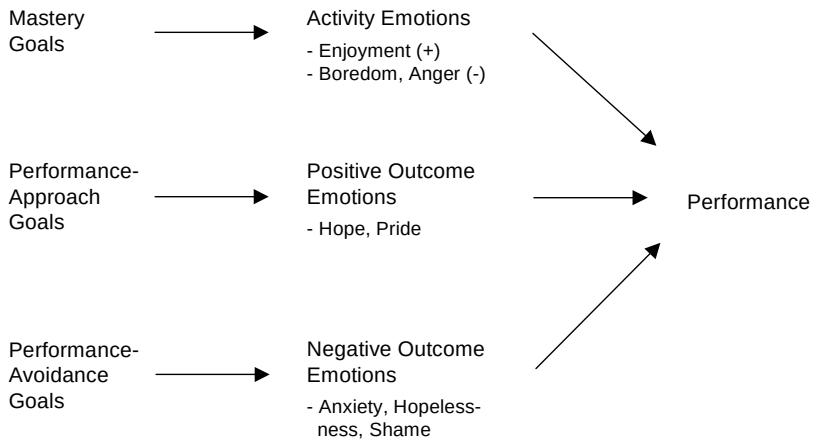

Figure 2. The proposed theoretical integration for achievement goals, achievement emotions, and academic performance from Pekrun et al. (2009)

Background of Snyder et al.'s and Pekrun et al.'s theories

The conflicting views of Snyder et al.'s and Pekrun et al.'s perspectives about hope may spring from entirely different conceptualizations of the construct hope, but a critical theoretical examination of the two views and an exploration of the potential for integration should contribute to a strengthening of hope theory and shall be attempted in this general theoretical part of the dissertation. Although the empirical examination is beyond the scope of this dissertation, a theoretical unification of the two perspectives is proposed in order to provide a constructive perspective on the fundamental debate if hope is a cognition or emotion.

First of all it shall be noted, that while hope is central in Snyder's hope theory, it is only one of several achievement emotions in Pekrun et al.'s theory. Considering the substantially larger hope specific research framework and since Snyder's framework is the one adopted throughout the dissertation, the discussion will focus on what Pekrun et al.'s perspective can add to Snyder's hope theory.

Second, from the perspective of science history it is noteworthy, that Snyder et al. (2002) had presented research and a detailed discussion about hope and achievement motivation in the Journal of Educational Psychology, the same journal in which Pekrun et al. (2009) published their results seven years later, notably without any reference of Snyder et al.'s earlier work.

It is necessary to reflect briefly on the reasons why the theories have not been connected, because it might provide clues in regards to the interpretation of the theories. This detachment most likely stems from Pekrun et al.'s unawareness of hope theory, despite the rather large body of hope research. It might also stem from deliberate omission due to the different conceptualization of hope, or the less central role of hope and hopelessness in Pekrun et al.'s work. The lack of integration is interpreted as inattention, rather than as a deliberate statement against the connection

between the theories. The following pages shall demonstrate how fruitful a combination of the two theories can be.

Correspondences in the Two Theories

Emotion. When situating Pekrun et al.'s hope related achievement motivations in Snyder et al.'s framework, they would correspond to the "emotion sets" in Snyder's (2000) model (see Figure 1). The emotional set casts a mood in the goal pursuit. It thus reflects the feelings of hope or hopelessness students experience towards their academic tasks. Pekrun at al. distinguish between activity emotions and outcome emotions, and see hope and hopelessness as outcome emotions. Snyder et al. (2000) do not make such a clear cut differentiation, and attest hope both functions: activity emotions in the form of the emotion sets and outcome emotions as feedback from goals.

Cognition. Pekrun at al. do not explicitly address the cognitive components of hope. In their theoretical framework cognition are resources, which are needed for learning and performance, and their availability is affected by emotions as described in Pekrun's (2006) control–value theory. Besides the cognitive resources needed for learning, emotions are seen to potentially affect students' academic performance by influencing their motivation and effort, their use of learning strategies and self-regulation. This parallels somewhat the cognitive components of hope theory: agency (motivation and effort) and pathways (learning strategies) and the interaction of agency and pathways (self-regulation).

Goals. Pekrun et al. (2009) see hopeful emotions as a result of mastery and performance-approach goals (and, conversely, hopelessness as resulting from performance-avoidance goals; see also Dweck, 1986). While Pekrun et al. state that goals create emotions, they do not address why a particular type of goal is chosen. Pekrun et al.'s reasoning (goals lead to emotions, which lead to performance) is

similar to the goal theory based model of Covington (2000), which suggests that goals lead to cognitions, which then lead to achievement. Peterson et al. (2006) see hopeful emotions and hopeful thinking as a result of learning goals.

In direct opposition to this view, Snyder et al. (2002) see hopeful cognitions precisely as the reason for the emergence of the different achievement motivations and goals. "…goals themselves do not produce behavior, but rather, people's views of themselves as being agents capable of initiating (agency) and implementing (pathways) actions to pursue valued personal goals (i.e., going to college) produce the helpless- or mastery-oriented responses." (Snyder et al., 2002, p. 821). Consequently, Snyder et al. propose that students' levels of hope lead them to choose learning or performance goals. "High-hope, and specifically high-pathways thinkers are able to conceive many strategies to reach goals and plan contingencies in the event that they are faced with impediments along the way. As such, goal blockages, which could be perceived as failures, are viewed as challenges to be overcome and are bypassed by the implementation of alternative pathways" (Snyder et al., 2002, p. 821). "Perceiving the likelihood of positive outcomes, these students focus on success and, therefore, experience less distress and greater positive affect (Snyder et al., 2002, p. 821)."

Suggestions for an Integrative Perspective

When trying to integrate these two perspectives four issues seem fundamental. First, Pekrun et al.'s theory suggests, that Hope theory could benefit from distinguishing different goals. Goals have inherent characteristics which feedback into the whole process model. Second, becoming more differentiated in regard to emotions seems also necessary in order to account for the complex functions of emotions. Third, the distinction of cognition and emotion is theoretically helpful, but in practice cognition and emotion are deeply interconnected and seem to

be much more iterative and intertwined. Fourth, when this integration is consequently conducted to the fundamental theoretical level the two ultimate strengths of the hope process model are fortified: the integration of cognition and emotion, and the abandonment of an artificially linear in favour of an explicitly iterative model. A linear model is probably overly simplistic and leads to superficial conflicts in causality between the two theories, which may be resolved by a more circular model.

Inclusion of the Characteristics of Goals. Snyder's (2000) hope theory could fundamentally benefit from an inclusion of characteristics of goals and from becoming more specific in regards to the nature and quality of aspired goals. The distinction of mastery, performance-approach, and performance-avoidance goals (Elliot, 1999) would be one way. Another, related one, would be the differentiation in intrinsically and extrinsically motivated goals (Ryan & Deci, 2000) and the degree of self-concordance of goals (Sheldon & Elliot, 1999). Snyder et al. (2002) state, that different people with different hope levels choose different goals. An explicit inclusion in the process model would make this important feature apparent, and lend itself to be included in interventions. Depending on the characteristics of pursued goals, emotional sets, emotional feedback and hopeful thinking should be affected differently. The fact that Pekrun et al. report that hope relates stronger to mastery goals than to performance approach goals is an indication, that hopeful thinking does benefit more from different sorts of goals. Consequently, through the encouragement of mastery goals hope should be fostered, while discouraging performance-approach and performance-avoidance goals should decrease the related negative emotions. Another indication of the importance of characteristics of goals is, that goals are an indication of the broader attitude of an individual: the growth-oriented mindset (Dweck, 2006) is characterized by hopeful thinking and individuals with growth

mindsets generally strive for growth goals. It is probable that hopeful people not only choose growth goals, but that these goals in turn foster hopeful thinking. Such self-reinforcing effects would permit interventions to address any part of the process of hopeful thinking.

Broadening the Spectrum of Emotional Feedback. In Snyder's (2000) process view of hopeful thinking emotions have two functions. First, they are simply seen as positive or negative feedback about the process of goal pursuit. Secondly, the emotion set for man "emotional attitude" with which individuals enter a situation. Both functions could benefit from an inclusion of more complex facets of emotions and go beyond "positive" and "negative" emotions. Particularly the explicit inclusion of emotions of hope/hopelessness would seem an important addition to hope theory. Additionally it would be interesting to explore if emotions like shame, pride, anger, anxiety or boredom have varying effects on hopeful thinking. The experienced achievement emotions could have an impact on how and to which extent experiences of successful goal pursuits actually do fuel hope (i.e. The successful pursuit of a performance avoidance goal could have no impact on hope although goal-attainment occurred.). The question is also if performance approach goals are more related to hope than mastery goals.

While the binary labelling of emotions might make the hope process model seem overly simplistic in regards to the complexity of human emotions, its power lies in the detailed interactional feedback processes. It is important to understand, that "positive" and "negative" emotions within hope theory are understood as basic emotional arousals, which then are cognitively interpreted. The interaction between trait hope and situational emotional arousal will result in a situational emotion set and state hope levels. (This would be the level at which hopeful / hopeless emotions are situated.). Thus positive arousal tends to strengthen state hope, which in turn over

time bolsters trait hope. Negative arousal will weaken state hope and over the long run reduce trait hope. Situational feedback bolsters agency and pathways thinking in their state form and repetitive exposure will result in more enduring trait hope. While the interplay between state and trait is still mostly theoretical speculation, it is important to keep in mind that arousal levels and states are the result of the interaction between the situation and individual traits. It is plausible to assume, that emotions do not only play a role in the situation itself, but also link the state with trait hope and form an emotional store of knowledge about the self. These emotional memories, rather than being conscious, represent complex aggregates of tacit knowledge going beyond being positive or negative. These "emotional summaries" about experiences form the underpinning of hopeful thinking and source of confidence, which is rooted deeply within the organism. In conjunction with episodic memories of successful goal pursuits, as cognitive anchor points, an autobiographical learning history emerges with the cognitive and emotional fuel for hopeful thinking and behavior.

Integrating Cognition and Emotion. There exists a deep interconnection of cognition and emotion and it is therefore necessary to step beyond the argument of „either – or" and adopt an integrative position where hope consists of both cognition and emotion. Snyder's process model does an excellent job at illustrating the interactive feedback processes between cognitions and emotions over time. Following the concept of affect-logic by Ciompi (1997) emotion and cognition are continually interacting in all mental activities: specific cognitions trigger specific emotions, and specific emotions modulate and change the related cognitive functions. It would also converge with the general common understanding, that humans *feel* hopeful or hopeless. When hope is needed most dearly it is not just a cognitive knowledge of pathways or knowing one can reach goals, but a *sense*, a

feeling, that there is a way, in the face of substantial contrary information. One can argue, that hope theory addresses this fundamental feeling or emotional essence in the agency component, in the form of trait and state.

From a conceptual viewpoint the boundary between feelings of hope/hopelessness and thoughts of hope/hopelessness seems not clearly defined. An empirical examination of the relation between the two constructs would indicate if their operationalizations are empirically distinct.

From a Linear to an Iterative Model. It is important that Snyder's as well as Pekrun et al.'s sequencing is theoretical. While Snyder et al.'s theory has only been tested in smaller sequences, Pekrun et al. did provide a longitudinal test (2009). Even though the modelling and figures for instance in Pekrun et al.'s work might suggest the determination of the casual chain. Pekrun et al.'s work is based on data of three time points during a week (Day 1: achievement goals/motivations, Day 6: achievement emotions, Day 7: exam performance). Although longitudinal, it is a rather short period of time and it would be interesting to analyse several sequences of goals, emotions, and performances and see if an iterative theory can be tested. Furthermore, for the integration of the two theories it would be crucial to tie in measures of hope and examine potential long-term feedback processes as well as the relation between hope and Pekrun et al.'s hope related emotions.

These differing views of causation can be resolved by adopting Snyder's (2002) view of hope as a process. Hopeful thinking is applied in a situation and emotional feedback from the perceived progress in goal pursuit is integrated with the trait hope thoughts. Situational learning occurs. The hope thoughts, which are the result of the learning history, in turn lead to a set of emotions and outcome expectancies with which the next situation is approached. Snyder (2002) sees hopeful thinking as being generally accompanied by trait-like emotional sets or moods,

which cast a positive affective tone on the goal pursuit process in general. Goal-directed cognitions during goal pursuit elicit particular emotions, which in turn shape and inform the cognitions of the person who is pursuing a goal (Snyder, 2002). This process-oriented view emphasizes the constant feedback interactions. The level of hope does influence the choice of goals, but the characteristics of the chosen goals also create emotional feedback and in turn facilitate or hinder hopeful thinking.

Snyder's original definition of hope as cognitive processes would be broadened by explicitly including hopeful/hopeless emotions and characteristics of chosen goals as components of hope. Higher performance could therefore result from a process of hopeful thinking, hopeful emotions and characteristics of the chosen goals.

Applying Hope Theory to the Workplace

Hope is conceptualized as a trait and the basis is thought to be established in childhood and young adulthood. Even so, hope is assumed to evolve throughout a person's live. Constant emotional feedback informs people about progress in their goal pursuits (Snyder, 2002), and nurtures or potentially deteriorates hopeful thinking. Overcoming hindrances in goal pursuit is viewed as particularly beneficial for instilling hopeful thinking (Snyder, 2002). Since work is commonly an important part of the human experience, it is also an abundant source for feedback from work related goal pursuits. Work environments thus provide individuals with numerous occasions to apply, train, and develop hopeful thinking. Experiences at the workplace can influence a persons' level of hope, for the better or for the worse. Positive experiences of successful goal pursuit and dealing with work problems nurture people's hope and build up psychological resources from which they can also benefit in other domains of live. People also impact and shape their environment and hope

plays a role in how they do that. Hope is a psychological resource, which helps people on one hand to cope with stress and difficulties at the workplace; on the other hand hope helps people to function more effectively and perform better.

The present dissertation consequently also focused on outcomes like mental health and performance. While Study 1 and 2 addressed the development of hope at the workplace, study 3 investigated the reciprocal effects of hope, mental health, and performance.

Situating the Present Research

The present dissertation contributed in different ways to the existing research. A longitudinal approach permitted to investigate the development of the same individuals over three consecutive years. Not only the development itself was analyzed, but also the impact of the environment was investigated. The study measured various characteristics of environments and tried to capture the dynamics between environments and individual's level of hope. The general assumptions of the hope theory were transferred to the workplace and potentially relevant practical implications were derived. And last but not least the hope theory, which was developed in the context of the U.S., was applied in a Western European context.

Longitudinal approach. Although a very detailed theory of hope development exists (Snyder, 2000), it has not been systematically tested. Longitudinal research is until now not very prevalent within hope research,, and when multiple waves of measurement are conducted, the timeframe is rather short (e.g.; Arnau et al., 2007). Studies 2 and 3 have longitudinal research questions and investigate individual's levels of hope over substantial timeframes.

The workplace as environment. Until now hope research within the context of work is limited, a large part of research took part in educational settings. Snyder and Feldman (2000) have theoretically discussed hope theory in the light of the

workplace. Adams et al. (2002) have conducted an exploratory survey amongst enterprises and deducted some qualitative characteristics of hopeful organizations and employees. Hope was linked to various positive outcomes at the workplace (e.g.; employee satisfaction and commitment). Peterson and Byron (2008) have documented the link between performance and hope with longitudinal research in different industries. Research on psychological capital (a higher order construct composed of hope, self-efficacy, resilience and optimism) has also contributed to hope research at the workplace and revealed positive relationships between hope and psychological well-being (Avey, Luthans, Smith, & Palmer, 2010), supportive climate, performance (Luthans, Avolio, Avey, & Norman, 2007; Luthans, Avolio, Walumbwa, & Li, 2005; Luthans, Norman, Avolio, & Avey, 2008), satisfaction (Luthans et al., 2007; Luthans et al., 2008), and commitment (Luthans et al., 2008), and conversely a negative association with absenteeism (Avey, Patera, & West, 2006).

The question how hope develops at the workplace has not been addressed at all. Thus, the present dissertation broadens the research within the workplace and adds also additional depth by taking a developmental perspective.

European Culture. Research about hope has been mainly conducted in the United States. Thus, the present study contributes in the cross cultural research. For the present dissertation the instruments had to be translated into German. Within Europe hope research is not yet very prevalent although theoretical papers (Hammelstein & Roth, 2002) and articles regarding measurements have been published (Brouwer, Meijer, Weekers, & Baneke, 2008).

Aims of dissertation

The aims of the dissertation have theoretical, empirical, and practical facets. The theoretical goal was to broaden hope theory by theoretically identifying and describing characteristics of environments, which should nurture hope. Additionally, this theoretical framework needed to be adapted to workplace situation. Furthermore, the consideration of motives underlying goals in regard to hopeful thinking seemed an important "blind spot" in hope theory. These theoretical contributions open up an abundance of new research questions.

Empirically, the challenge was to find appropriate methods to model the different perspectives (trainees, trainers) and longitudinal measures adequately in order to investigate the research questions. The used methods incorporated different perspectives and adopted a structural equations approach, providing examples for other hope studies how similar research questions could be addressed.

Practically, the dissertation aimed at applying U.S. research to the European context, and more precisely the Swiss vocational training in enterprises. An aim was to investigate the development of hope within such training and the potential relation to positive outcomes such as mental health and performance. Potentially the results would give vocational trainers, enterprises, and government entities recommendations how to shape workplaces and training context in order to promote the character strengths hope, and also provide an empirical rationale for doing so.

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Study 1 : Hope, self-determination and workplace learning: A multilevel study in vocational training

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Abstract

The present study investigated hope in the context of vocational training. The theoretical framework combined the theory of hope with core ideas of self-determination theory. The main hypothesis assumed a positive relationship between general hope and the satisfaction of basic psychological needs in the learning environment at the workplace. The analysis of cross-sectional questionnaire data collected in a vocational training context integrated the perspectives of trainees, groups of trainees and trainers using multilevel modeling. First, the study found that a substantial amount of variation in individual hope was associated with the learning environment, suggesting a potential influence of the environment on hope. The hypothesized positive relationship between hope and the satisfaction of three basic psychological needs (relatedness, autonomy and competence) in the work environment was supported. The study recommended the creation of autonomy-supportive work environments to facilitate the satisfaction of basic psychological needs and nurture hope.

Introduction

While the obvious goal vocational education and training (VET) is to develop vocational competencies, the development of personal and social competencies and the promotion of a healthy development of the person are also essential, especially because VET generally takes place during the critical developmental periods of the late teens, emerging adulthood, and young adulthood (e.g., Arnett, 2000; Sirsch, Dreher, Mayr, & Willinger, 2009).

What are characteristics of workplaces which help trainees to build up resources and nurture their strengths? Strengths of character have been proposed to be a neglected, but critically important resource for organizations (e.g. Peterson & Park, 2006). The present article focuses on the strength of hope (Snyder, 2000a), and strives to learn more about workplace factors and characteristics of organizational systems, that facilitate the development and nurturing of hope during VET. In order to evaluate the different work environments the present study is inspired by self-determination theory (SDT) (Deci & Ryan, 1985a) and investigates if the perceptions of psychological characteristics of environments esteemed important by SDT do relate to hope in a workplace learning environment.

Hope Theory

Defining Hope

Hope is "the process of thinking about one's goals, along with the motivation to move toward those goals (agency), and the ways to achieve those goals (pathways)" (Snyder, 1995, p. 355). As such, hopeful thinking is goal-directed (Snyder, 2002) and these goals are personally valued (Snyder et al., 1991). The progress in goal-attainment is monitored and the resulting emotional feedback regulates and influences behavior, as well as the two components of hope: agency and pathways thinking. Hope is not an emotion but rather a dynamic cognitive

motivational system (Snyder et al., 1991). The hope theory (HT) of Snyder et al. does not refer to wishful thinking, as in hoping to win the lottery or hoping for good weather: hope is the confidence that one will find a way to reach one's goal despite uncertainty. Hope is related to constructs like self-efficacy, optimism, resilience, but has been shown to be empirically and theoretically distinct (e.g., Magaletta & Oliver, 1999; Snyder, 2002). While for example self-efficacy is related to a particular task, context and domain (Bandura, 1997), hope is very general and more oriented towards a yet uncertain future.

Why Is Hope Important at Work?

Hope is "the process of thinking about one's goals, along with the motivation to move toward those goals (agency), and the ways to achieve those goals (pathways)" (Snyder, 1995, p. 355). As such, hopeful thinking is goal-directed (Snyder, 2002) and these goals are personally valued (Snyder et al., 1991). The progress in goal-attainment is monitored and the resulting emotional feedback regulates and influences behavior, as well as the two components of hope: agency and pathways thinking. Hope is not an emotion but rather a dynamic cognitive motivational system (Snyder et al., 1991). The hope theory (HT) of Snyder et al. does not refer to wishful thinking, as in hoping to win the lottery or hoping for good weather: hope is the confidence that one will find a way to reach one's goal despite uncertainty. Hope is related to constructs like self-efficacy, optimism, resilience, but has been shown to be empirically and theoretically distinct (e.g., Magaletta & Oliver, 1999; Snyder, 2002). While for example self-efficacy is related to a particular task, context and domain (Bandura, 1997), hope is very general and more oriented towards a yet uncertain future.

The Genesis of Hope

Snyder (2000a) points out the relevance of hope for a fast changing world and conceptualizes it as something that is learnable. A lack of hope is a result of not being taught to think in this manner or a consequence of intervening forces destroying such hopeful thought during childhood or later in life (Snyder, 2000b , 2002). The social environment plays a crucial role by modeling and coaching hopeful thinking and behavior (Snyder, 2000a). In general hope is promoted by encouraging individuals to come up with their own ideas of how to get around impediments, while adequate support should be available to learn how to cope with setbacks and gain experience finding alternative solutions (Snyder, 2000a; McDermott & Hastings, 2000). The accumulation of experiences in an environment which fosters these characteristics should eventually lead to a core self-belief that the individual is capable of generating pathways and of sustaining the energy necessary to pursue goals. In addition to the creation of environments to foster the learning of hope, specific interventions have been developed to increase hope in individuals or teams (e.g., Lopez et al., 2004, Luthans & Jensen, 2002).

Three Basic Psychological Needs

The SDT is inspired by humanistic psychology (e.g., Rogers, 1961) and focuses on the social-contextual conditions that foster positive human potential, natural processes of self-motivation and healthy psychological development (Ryan & Deci, 2000). According to SDT humans have three innate psychological needs: competence, autonomy, and relatedness. The satisfaction of these needs leads to enhanced self-motivation and mental health. When the needs are not satisfied the results are diminished motivation and well-being. In workplace related research the satisfaction of the basic needs has been found to relate to positive outcomes such as the acceptance of organizational change (Gagné, Koester, & Zuckermann, 2000),

employee engagement (Meyer & Gagné, 2008), integration of extrinsic motivation as well as maintenance of initial intrinsic motivation (Gagné & Deci, 2005).

Internalization of Extrinsic Motivation: What motivates people?

SDT does not treat motivation as a unitary concept that varies primarily in amount and not kind (Deci & Ryan, 2008). Instead three different types of motivation are distinguished: amotivation (not motivated), controlled motivation (behaving with the experience of pressure and demand toward specific outcomes that comes from forces perceived to be external to the self) and autonomous motivation (behaving with a full sense of volition and choice). SDT assumes that extrinsic motivation can become more autonomous when people experience the satisfaction of their basic psychological needs (Deci & Ryan, 2008). Autonomous motivation is related to psychological health, healthier lifestyles, less burnout at work (Deci et al. 2001; Deci & Ryan, 2008); as well as work satisfaction, psychological health, and self-esteem after controlling for the extrinsic factors of pay and job status (Ilardi, Leone, Kasser, & Ryan, 1993).

Bridging HT and SDT

The Link between Hope, Self-concordant Goals, and Autonomous Motivation

Work is one of the main areas of life where humans are confronted with external demands and have to pursue goals which are often externally imposed. Particularly for young trainees entering the workforce the development of a professional identity and pride is an important part of successful socialization, which ideally coincides with developing a rather autonomous motivation. SDT attributes the degree to which these external demands are internalized and work motivation becomes more autonomous to a combination of the satisfaction of the basic psychological needs in the social environment and individual differences (Gagné & Deci, 2005; Milette & Gagné, 2008). The initial step of engaging in hopeful thinking

at the workplace is to adopt work related goals and to identify with them to a certain degree, because goals are the cognitive component that anchors hope (Snyder, 2002). HT does not really address the processes of goal adoption and motives of goal pursuit. While HT focuses more on *how* goals are pursued, the SDT distinguishes extrinsic and intrinsic forms of motivation and addresses *why* people pursue goals and how they identify themselves with external demands (Deci & Ryan, 2000). SDT can thus contribute to HT by explaining which learning environments can enhance goal adoption and identification with work related goals.

Hope is viewed as inseparable from meaning and purpose (Snyder & Feldman, 2000). Implicitly the supposition is that hopeful thinking is directed towards goals which make sense to the individual and are coherent with the values of the individual. SDT related research has shown that more self-concordant goals (Sheldon & Elliot, 1999), goals which are consistent with a person's developing interests and/or core values, are related to well-being and are pursued with more sustained effort to be achieved and thus are more likely attained. These self-concordant goals should thus be associated with deeply rooted agency thoughts, necessary to sustain the action, and spur the pathways thinking to overcome barriers in the goal attainment process. High-hope employees are likely to also be hopeful in their personal lives, because of the strong relation between purpose in life and hope, and work being a prominent source of sense of purpose (Adams et al., 2002). It also fits the picture that the descriptions of high hope people and autonomy oriented people converge in numerous ways (Snyder, 2000a; Ryan & Deci, 2006). "The agency component of hope involves setting realistic goals and then reaching for those goals with self-directed determination and a perception of internalized control" (Simmons, Gooty, Nelson, & Little, 2009, p. 236). Addressing the process of internalization of external motives and taking into account the degree of self-

concordance of goals could thus benefit HT to better understand how deeply rooted motivations fuel hope and enable people to withstand in the face of obstacles.

Hope and the Satisfaction of Basic Psychological Needs

Once an individual adopts a goal, the basic premise for hopeful thinking is fulfilled. Subsequently the question is how hopeful thinking can be fostered at the workplace. HT has described the characteristics of high hope workplaces (Adams et al, 2002). They seem to satisfy the three basic psychological needs which the SDT considers essential for optimal development. The present study explicitly formulates the corresponding theoretical relations between the satisfaction of the three basic psychological needs and hope.

The need for competence. Hope should be nurtured by experiences of competency. First, the broadened action repertoire translates into having access to more pathways and provides individuals with resources. Second, the experiences of success, goal-attainment and overcoming of hindrances provide positive emotions and bolsters agency and pathways thinking. Third, experiencing being competent implicitly also means that individuals have transitioned states and situations of incompetence and acquired competencies in order to cope with workplace demands. They thus have a learning history of overcoming hindrances, which should empower them to also deal with further demands. Development of competencies in vocational training can therefore affect general hope and spill over in various life domains.

The need for autonomy. Experiencing autonomy seems to be crucial for the development of hope in the following ways. First, with increasing degrees of autonomy the possibilities for developing new pathways and influencing situations are enhanced. Being able to experiment, coming up with one's own solutions to problems without being assisted to soon or constrained through prescribed procedures brings people to apply and train hopeful thinking. Secondly, having

autonomy translates into having a certain degree of control, which is essential to experience one's own agency. Thirdly, by being accorded more autonomy individuals are signalled trust and confidence in their ability to master a problem and deal with difficulties. Trust and confidence in individuals, especially when they are developing and maybe somewhat doubtful towards their own capacities, can spur hope through the mechanism of social persuasion (e.g., Bandura, 1997).

The need for relatedness. Incorporating attachment theories SDT suggests that over the lifespan intrinsic motivation flourishes more likely in interpersonal settings characterized by a sense of security and relatedness (Ryan & Deci, 2000). HT research linking hope and attachment styles has suggested that secure attachment to a supportive and responsive adult facilitates the development of a young person's hopeful goal-directed thinking (Shorey, Snyder, Yang, & Lewin, 2003). The vocational training is socially situated with a lot of interactions between the individuals, the trainers, other trainees, and other employees. "The presence of a responsive adult who is simultaneously caring, has high expectations, and demands high levels of performance can instil hope in a developing young person" (Shorey et al., 2003, p. 709). The experience of relatedness creates social meaning, supports the internalizing of external demands, and facilitates social model learning. Workplace research found a significant, positive relationship of secure attachment with hope and trust (Simmons et al., 2009). Furthermore, HT has recommended hope fostering behavior (Snyder, 2000a), which mirrors one of the SDT's key concepts: autonomy support (Deci & Ryan, 1985a), a manner of interaction suggested by SDT to facilitate the satisfaction the basic psychological needs. An autonomy-supportive person or work environment would typically provide a good rationale for asking someone to engage in an activity, offer the person some choice, acknowledge the person's feelings toward the activity, and encourage the person to take initiative and

convey confidence in the person's abilities (Williams, Gagné, Ryan, & Deci, 2002). Autonomy support research can give further suggestions for hope promotion.

Research Questions

The preliminary research question was to test the hypothesis that vocational learning environments relate to individuals' levels of general hope.

Hypothesis 1: The portion of individual hope variance associated with the vocational learning environment (random effect: trainee group) is meaningful (exceeds 5% of total variance).

The second research question investigated if the satisfaction of the basic needs, as a characteristic of the learning environment, relates positively to hope.

Hypothesis 2a: The three individual perceived basic need satisfactions relate positively to individual levels of hope.

The relation between hope and an individual's perceived need satisfaction is potentially inflated, because of the common method of self-report and because it is likely that hopeful trainees also perceive their situation more favourably. The directionality between hope and the needs could go either way or be bi-directional. In order to address these concerns we used additional data at the group level, which should be less influenced by self-report bias and be a more objective measures of the general VET environment. We assumed that divergences in individual perceptions of the environment balance each other out when the different perceptions of trainees from the same learning environment are integrated. Thus, the perceptions of trainees which were guided by the same trainer were aggregated in order to form a less biased measure of the workplace environment.

Hypothesis 2b: The averages of need satisfaction of trainees in a similar vocational training environment (grouped by their vocational trainer) relate positively to individual levels of hope.

Another independent evaluation of the general conditions in the VET environment stemmed from trainers' ratings of the potential need satisfaction of their group of trainees.

Hypothesis 2c: Trainer ratings of trainees' need satisfaction relate positively to individual levels of hope.

Method

Sample

The study took place in the framework of vocational training research in the German-speaking part of Switzerland and was restricted to one particular profession: polymechanics. Switzerland has a dual system of vocational training in which public vocational schools and mostly private companies work together to train and educate young professionals. During the four years of the polymechanic apprenticeship the trainees learn on the job at their company and attend vocational school for one or two days a week. The respondents selected for this analysis consisted of a sample of trainees (N=450) and their trainers at the workplace (N=58) from 49 different companies. Only trainers with at least three responding trainees were selected. The trainees had an average age of 18.54 years (SD = 1.30) and 89% were native German speakers. The trainers were on average 40.74 years old (SD = 10.71) and 97% were native German speakers. Only 3% of the trainees were female and only 2 trainers were female (less than 1%). There were no significant differences due to gender or native language in the used trainee variables.

Procedure

The potential participants were contacted through the two largest associations of the Swiss mechanical industry, which provided contact information and encouraged their members to participate. The participating trainees either filled out paper and pencil questionnaires administered by their regular trainers in the work

context during work hours, or they completed an identical online version of the questionnaires if computers were available at the workplace. In order to increase motivation for a full completion of the questionnaire gift, certificates of substantial value were given away to seven randomly chosen participants. The response rate of the trainees in the contacted companies was around 80%.

Measures at the trainee level. As indicators of the satisfaction of the needs for relatedness, autonomy and competence, three adapted or newly developed scales were used. A confirmatory factor analysis to test the postulated factor structure was conducted with the statistical software AMOS 6.0 (Arbuckle, 2005). The analyses reported below are based on full information maximum likelihood estimates including means and intercepts (Enders & Bandalos 2002; Raykov, 2005). The model without any correlated errors fitted the data acceptably well (χ^2 (17) = 40.64, p <. 01, χ^2/df = 2.39, RMSEA = .04, CFI = .99). Factor loadings ranged from .47 to .91 and the latent factors correlated between r = .20 to .35.

Relatedness. Two items measured the trainee perceived quality of the personal relationship with the trainers and the peers relation with the trainers (Baeriswyl, Wandeler, & Oswald, 2006), in order to reflect the potential for satisfying the need for relatedness in the particular vocational learning situation. These two items read as follows: "In general the relationships between trainers and trainees are very good in our company" and "My relationship with my trainer is very good." The items were answered on a 4-point Likert-type scale ranging from 1 (definitely true) to 4 (definitely not true). The internal reliability was satisfying (α = .78).

Autonomy. Originally included in Hackman and Oldham's Job Diagnostic Survey (1975), Scharnhorst et al. (2006) adapted a German translation to fit the targeted population of the present study (3 items; e.g., "My work provides me with

numerous occasions to decide how to proceed."). The internal consistency was low (α = .56). The face validity of the underlying items seemed to be sound and indicated a quite broad measure of autonomy, which should be favourable to external validity.

Competence. This scale was developed by Frey and Balzer (2005) for the present project to measure self-perceived competency as a polymechanic. The trainees were asked to rate how well they performed 25 different professional skills on a 5-point Likert-type scale ranging from 1 (badly) to 5 (well) (25 items; e.g., "to produce parts by hand", "to choose the right tools and prepare them", "interpret assembling instructions"). The internal consistency of the scale was satisfying (α = .91).

Hope. Hope was measured with a previously tested backtranslated German version (Wandeler, 2003) of the Adult Dispositional Hope Scale (Snyder et al., 1991). The participants answered eight items on a 6-point Likert-type scale ranging from 1 (definitely false) to 6 (definitely true). Together the eight items form the overarching hope construct, which consists of two subscales with four items each: pathways or ways (sample item: "Even when others get discouraged, I know I can find a way to solve the problem.") and agency or will (sample item: "I energetically pursue my goals."). Cronbach's alpha for the hope scale was .76 and the factor structure (agency and pathways) was replicated in a principal components analysis using varimax rotation (two resulting Factors, both with eigenvalues above 1, explained 51.9% of the total variance). The correlation between agency and pathways factors was r = .50, which lies in the range of correlations reported by Babyak, Snyder, and Yoshinobu (1993) (rs = .40 to .50).

Measures at the group level. ***Relatedness (Trainer perspective).*** In order to get an estimate of the quality of the relationships between the trainees and trainers from the perspective of the trainers, the two items of the trainee measure were

adapted to fit the trainer perspective (i.e., "In general the relationship between trainers and trainees is very good in our company," "My relationship with my trainees is very good."; Baeriswyl, Wandeler, & Oswald, 2006). The two items were answered on a 4-point Likert-type scale ranging from 1 (definitely true) to 4 (definitely not true) and the internal reliability was low but acceptable (α = .67).

Autonomy (Trainer perspective). To measure the trainers' perceptions of the degree of autonomy the trainees' work situation provided, the wording of the autonomy items used for the trainees were adapted to fit the trainers' perspective (e.g., "The trainee's work provides them with numerous occasions to decide how they proceed."). The scale consisted of 3 items and showed satisfying internal reliability (α = .70).

Aggregated relatedness, autonomy and competence (Trainee group means). To reflect the perceptions of the shared learning environment, corrected for individual idiosyncrasies, scores of individual subjects were aggregated to the group level (see e.g., Lüdtke, Trautwein, Kunter, & Baumert, 2006a). Intraclass correlations (ICC) were calculated in order to provide an indication of the reliability of the individual trainee's rating ICC(1) and the reliability of the aggregated trainees' rating at the class level ICC(2) (see Bliese, 2000; Snijders & Bosker, 1999; Lüdtke, Trautwein, Kunter, & Baumert, 2006b). Lüdtke et al. (2006a) explain the ICC(1) as "the proportion of total variance that can be attributed to between-class differences" and "the extent to which the class-mean score is interchangeable with individual student ratings, with higher ICC(1) scores indicating higher reliability" (p.218). The ICC(1) is the variance between classes divided by the variance between classes plus the variance within classes. Lüdtke et al. (2006a) recommend to calculate the ICC(2) "when it is not just a question of determining the reliability of an individual student rating, but of gauging the accuracy of a class-mean rating" (p.218). The ICC(2) is

computed like the ICC(1), but the variance within classes is divided by the average class size.

The ICC(1) scores in the present study indicated sizable differences between the groups for *relatedness* (.25) and small differences for *autonomy* (.07) and *competence* (.04) across the groups. The ICC(2) was .66 for relatedness. This rather high agreement of the trainees within a trainer group indicates that the group level assessment of relatedness was quite reliable. The ICC(2) for autonomy (.29) and competence (.22) were low, thus indicating that the aggregated measures of autonomy and competence were not very reliable and rather large differences exist between the ratings of individuals within a group. While interindividual differences were expected for competence, the finding suggests, that also autonomy is heavily subjective.

Statistical Analyses

The data of this study, similar to other educational or organizational contexts, had a nested structure: trainees were grouped within different trainers , which in turn were nested in different companies. In comparison with other trainees, trainees of the same trainer might be more similar to each other, because they shared a similar environment or might have been selected in similar ways . Thus a consequence of the nested structure of the data could be a violation of the statistical assumption of independence of measurement. Since the group level accounted for a substantial amount of variance (11.4%) of the dependent variable hope, and only 2% variance was at the level of companies; the hierarchical structure of the data was taken into account, and two level multilevel analyses were computed (Raudenbush & Bryk, 2002). Two main advantages of multilevel models are the corrected estimates for standard errors, which reduces the probability of finding statistically significant relationships where in reality there are none (type 1 or alpha error) and to allow

relationships between variables to differ across different groups (random slopes). These varying relationships in turn can be predicted by variables (slopes as outcomes models). The hypotheses were tested with two-tailed significance tests: a conservative test, due to the clearly directed hypotheses one-sided tests would be justified. The output of the software package used for the multilevel analyses (HLM 6.04, Raudenbush, Bryk, Cheong & Congdon, 2004) does not report standardized regression coefficients. Before performing the multilevel analyses, we therefore standardized all the variables ($M = 0$, $SD = 1$) to enhance the interpretability of the resulting regression coefficients. The regression coefficients indicate the proportion of a standard deviation by which the dependent variable will increase/decrease if the predictors increase/decrease by one standard deviation. All models were estimated by using the restricted maximum likelihood estimation technique (Bryk & Raudenbush, 1992).

Results

Descriptive analyses

The descriptive statistics of the variables hope, relatedness, autonomy and competency are reported in Table 1. The trainee and the trainer ratings of relatedness were high and at similar levels, but the trainer ratings of autonomy were higher than the average of the aggregated trainee ratings (t (449) = 8.85, p <.001). Hope correlated the highest with competency. The needs correlated with each other except for competency and relatedness.

Table 1

Means, standard deviations and correlations of ratings of individual trainee (1-4), trainees' mean by trainer group (5-7), and trainer (8-9)

	M	SD	1		2		3		4		5		6		7		8	
1 Hope	4.75	.53																
2 Relatedness (individual)	3.42	.59	.24	***														
3 Autonomy (individual)	5.11	.95	.23	***	.17	***												
4 Competency (individual)	4.11	.46	.44	***	.09		.21	***										
5 Relatedness (group mean)	3.41	.37	.23	***	.62	***	.16	**	.03									
6 Autonomy (group mean)	5.11	.42	.17	***	.22	***	.44	***	.07		.35	***						
7 Competency (group mean)	4.11	.19	.26	***	.06		.07		.41	***	.09	*	.15	***				
8 Relatedness (trainer)	3.42	.45	.13	**	.21	***	.03		.05		.33	***	.06	*	.14	**		
9 Autonomy (trainer)	5.44	.76	.01		.00		.08		.00		-.02		.19	***	-.01		.42	***

Note. * p < .05. ** p < .01. *** p < .001.

The correlations between the trainers and the average of the groups of trainees indicated the degree of agreement between the ratings. A look at this validity line showed that trainer-rated relatedness correlated significantly (r = .33) with the trainees' average for relatedness, and likewise trainer-rated autonomy correlated significantly (r = .19) with the trainees' mean for autonomy. The correlations on the validity line were low, but they were higher than the correlations with the other constructs, thus giving some indication for validity.

Predicting hope with individual level variables

The unconditional model (null model without any predictors) revealed that 11.4% of the variance of an individual's hope was associated with the group of trainees, suggesting that the vocational learning environment does relate to an individual's level of hope. Thus hypothesis 1 was supported and multilevel models were specified to account for the nested structure of the data.

In models 1-3 (see Table 2) individual hope was regressed on trainee perceived relatedness, autonomy and competence. All three indicators for need satisfaction significantly predicted hope. In order to test if the relationships between hope and needs were different in the various groups of trainees the models 1-3 were also tested with random slopes. The random slopes were not statistically significant, indicating that the relationships were similar across the different groups of trainees. Consequently all subsequent reported models are random intercepts models with fixed slopes. In model 4 hope was simultaneously regressed on all three indicators, which all independently contributed information to the prediction of hope, with competence being the strongest predictor along with weaker contributions by relatedness and autonomy. The models 1-4 thus support hypothesis 2a.

Table 2

Individual level models: prediction of hope by the satisfaction of basic needs indicators

	Model 1		Model 2		Model 3		Model 4	
	B	SE	B	SE	B	SE	B	SE
individual level								
Relatedness	.22 ***	.05					.15 **	.05
Autonomy			.23 ***	.06			.15 **	.05
Competence					.43 ***	.04	.38 ***	.05
R^2	*.09*		*.07*		*.21*		*.28*	

Note. * p < .05. ** p < .01. *** p < .001.

Comparing group level variables

The next model sequence (models 5-10) integrated information at the group level (trainees' means and trainer ratings) at first without controlling for any individual level predictors (see Table 3). In model 5 the group means for the basic needs were entered simultaneously at the group level. Average relatedness and competence were significant predictors of hope and explained about 10% of the total variance. Autonomy was not statistically significant. The competency average was dropped for the comparison of the different sources of information at group level (models 6-7), given that there was no rating of competency by the trainers (It was to complex to get a detailed rating of competence from the trainers for each of their trainees). By dropping competency (model 6) the explained variation dropped substantively (6%) and the group average for autonomy now reached statistical significance. Thus hypothesis 2b was partially supported. For the trainer ratings (model 7) only relatedness was a marginally statistically significant predictor of hope, thus not substantially supporting hypothesis 2c. The comparison of the different sources of group level data suggests that trainee group indicators for the environment were more related to individual trainee's hope than the information obtained from trainers.

Table 3

Individual and group level model (trainees' means, trainers): prediction of hope by the satisfaction of basic needs indicators

	Model 5		Model 6		Model 7		Model 8		Model 9		Model 10	
	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE
individual level												
Relatedness							.10	.06	.15 **	.05	.14 *	.05
Autonomy							.14 **	.05	.14 **	.05	.15 *	.05
Competence							.38 ***	.05	.34 ***	.05	.37 ***	.05
group level												
Relatedness (group mean)	.17 *	.05	.18 **	.06			.11 †	.06			.10	.06
Autonomy (group mean)	.07	.05	.14 *	.07							-.01	.06
Competence (group mean)	.24 ***	.05							.11 *	.05	.11 †	.06
Relatedness (trainer)					.13 †	.07						
Autonomy (trainer)					.02	.09						
R^2	*.11*		*.06*		*.01*		*.29*		*.29*		*.29*	

Note. † <.07 * p < .05. ** p < .01. *** p < .001.

Combining trainee level and group level variables

The models 8 through 10 combined the individual level and the group level information (see Table 3), thus testing hypothesis 2b more stringently. By controlling for the perceived need satisfaction at the individual level, one can explore which additional effect the average perceived satisfaction in a trainee's group had on the individual's level of hope. In model 8 the group perceived relatedness was marginally significant; however reducing the effect of individual level reported relatedness. In model 9 the trainees' means of perceived competency was statistically significant. Trainees with similar need satisfaction displayed slightly higher levels of hope when the reported level of competency in their group was higher. In model 10 all trainee group indicators were added simultaneously, with competency being marginally significant. However, the explained variation increased only by 1%, indicating that the individual perceptions of need satisfaction account for most of the variation.

Discussion

The hypothesized positive relationships between hope and the three basic needs variables ─relatedness, autonomy and competency─ were empirically supported with individual data and partially supported with group level data. Hope was most closely linked to competency, while autonomy and relatedness were also statistically significant predictors. Accounting for almost a third of the explained variation, the strength of these relationships with hope was meaningful and the independent contributions of the constructs converge with results of SDT (Ryan & Deci, 2000), suggesting that all three needs are important. The fact that perceived professional competency is the strongest predictor of hope, suggests that professional experiences and development of professional skills can be an important source for hopeful thinking and as such do spill over to the broader life experience. Similarly,

the experience of relatedness and autonomy in the vocational context can contribute in nurturing hope.

According to triadic reciprocal determination (Bandura, 2008) individual's traits, individual's states, individual's behavior and the situation are highly interactive. Personal characteristics not only shape perception, but actually influence the situation and elicit reactions from the environment. Self-reports are therefore probably the most appropriate indicator for a highly subjective experience, however avoiding the common method bias of self-report remains a challenge. The self-report bias was addressed by using measures at the group level, which should be a more objective reflection of the environment. The existing relations of the perception of trainee groups with individual levels of hope should thus provide stronger support for the main hypothesis. However, the group level predictors based on the trainer ratings hardly related to individual levels of hope.

That the aggregated trainees' estimates of competency predicted individual hope after controlling for individual indicators of need satisfaction points to the general importance of providing trainees with feelings of competency at the workplace. Environments where trainees in general feel competent can thus benefit individuals' hope beyond their personal feelings of competence. HT has not extensively researched group related processes in the development of hope. Possible explanations for these group level effects could be contagion processes, the occurrence of social learning, and other positive social dynamics fostering hope within organisations. The average level of perceived competency could also be a proxy for the general quality of the particular vocational training, and thus reflect other qualitative characteristic of workplaces not directly measured in this study.

Limitations and future research

Causal inferences. The reported results are based on cross-sectional data and therefore no causal inferences can be made. Rather than effects of the environment the common variance at trainee group level could result from measurement effects (e.g., similar setting when filling out the questionnaires), selection processes by the company, or self-selection. Because the aim of vocational training is to influence and shape individuals, it is more apparent to assume an influence of the context on the individual. But the reverse causal directionality is also plausible: high hope people may perceive an environment in a more positive way or actually interact with their environment in ways which lead to modified conditions with higher need satisfaction. As a matter of fact, such reciprocal processes are assumed by SDT (Deci & Ryan, 1985b). Likewise, HT would suggest that people with higher hope perceive their environment more positively, since it is precisely an attribute of high hope people to see more pathways to obtain their goals and be more energetic during the goal pursuit. Future research could use longitudinal data to investigate questions about the interactions between the individual and the environment, as well as positive reinforcing feedback loops, and use experimental designs to evaluate the influence of trainer behavior and work characteristics.

The issue of confounding through self-report has been partly addressed by forming averages of trainee groups and the inclusion of trainer ratings of the general situation of their trainees. Independent ratings of the situation of each individual trainee by neutral observers might have given more objective and more reliable measures of the environmental conditions. Future research could use such independent data to address questions regarding how the subjective experience of satisfaction of basic psychological needs relates to observer-rated conditions and the

role hope plays in these processes. HT also would benefit from a more thorough analysis of the effects of group processes and other workplaces characteristics.

Internal validity. The measurement of the need satisfactions competence and relatedness was quite reliable, but the trainee-reported autonomy scale had a low reliability. Autonomy has repeatedly been reported to be difficult to measure reliably (e.g., Deci et al., 1989; Greguras and Diefendorff, 2009).

External validity. Priming and framing effects could have inflated the degree to which workplace factors are related to general hope of young trainees, because the trainees responded at the workplace and the questionnaire was mainly focused on work related issues. The large, real-world sample suggests a strong ecological validity for the population of German-speaking polymechanic trainees. Although no gender-specific effects were assumed, it would be important to examine gender-specific effects of work environments. Also, the findings should be replicated with other professions (e.g., would effects between competency and hope also exist in a profession with less demanding skills?). Furthermore older adults might show different effects than young adults, who are still developing their personalities and competencies. Future research should use specific measures developed within the SDT research to facilitate more detailed comparisons.

Practical implications

In order to promote hope, organizations should not only consider proven short-term interventions, which focus on the individual, but also strive to create enduring favorable conditions at the workplace. The satisfaction of the basic psychological needs is a feature of the workplace and the organizational culture which can create a constant positive dynamic at the organizational level to nurture hopeful thinking: trainees have to feel that they are becoming competent, experience autonomy and positive relational bases in their social environment. Through

autonomy-supportive behavior trainers can contribute to satisfy the basic psychological needs. At the organizational level the high-involvement organization (e.g., Lawler, 1992) could be a model for promoting hope.

Conclusion

The present study found empirical support that the level of individual's hope is related to a certain degree to group membership, suggesting a relation of workplace experiences to hope. The fact that important character strengths of young people are connected to their VET environment shows that the social context and the learning environment at work can substantially support the development of psychological strengths. By incorporating ideas of SDT into HT the study suggested that one of the characteristic of hope nurturing workplaces is the satisfaction of basic psychological needs. HT and SDT can give valuable suggestions how to nurture hope through favorable work environments and the hope promoting behavior of trainers. In regard to the future development of the hope construct, this study laid out the theoretical argument that the characteristics and the self-concordance of goals affect how strong hopeful thinking is and that they provide the underlying support of meaning in which hopeful thinking is taking place. Besides the satisfaction of basic psychological needs the characteristics of work-related goals could thus be a central component of the beneficial effects of workplaces on hope and other character strengths.

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Appendix A: Details of Hierarchical Linear Modeling Analyses

A more detailed explanation of the modeling approach with Model 9 as an example

Level-1 Model:

$$Y_{ij} = \beta_{0j} + \beta_{1j}*(\text{relatedness}_{ij}) + \beta_{2j}*(\text{autonomy}_{ij}) + \beta_{3j}*(\text{competency}_{ij}) + r_{ij}$$

Level-2 Model:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}*(\text{relatedness trainer}_{j}) + \gamma_{02}*(\text{autonomy trainer}_{j}) + u_{0j}$$

$$\beta_{1j} = \gamma_{10}$$

$$\beta_{2j} = \gamma_{20}$$

$$\beta_{3j} = \gamma_{30}$$

Y_{ij} represents the hope score of the trainee i in the group of trainees j. β_{0j} represents the average hope score in the jth group. In group j the effect of the trainee's perceived relatedness on the trainee's specific hope score is β_{1j}. Likewise β_{2j} and β_{3j} are the effects of the trainee's perceived autonomy and competency on the trainee's hope score in group j (In this model all three coefficients have been treated as fixed effects and do not vary across groups. After finding out that the random slopes u_{1j}, u_{2j} and u_{3j} are statistically non significant, they were set to zero.). Random variation across students is represented by the residual term r_{ij}.

In the level 2 equations the group's specific intercept β_{0j} is specified as a function of the grand mean of hope in all groups γ_{00} (average group mean of hope when trainer rated relatedness and autonomy trainer are average) plus the effect of trainer rated relatedness γ_{01} and autonomy γ_{02}, plus random variation across groups represented by u_{0j}.

Study 2 : Hope and self-determination of young adults at the workplace

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Abstract

This study suggested that the conditions Hope theory postulates as crucial for the favorable development of hope essentially reflect to a great extent the satisfaction of the basic psychological needs proposed by Self-determination theory. Hope was also postulated to be stronger when it is directed towards self-concordant goals. This longitudinal field study empirically tested the assumed positive reciprocal longitudinal interactions between hope and the satisfaction of basic psychological needs in the work environment during three years of vocational training. The three annual questionnaire surveys of 414 trainees were analyzed with latent autoregressive cross-lagged models. The tested longitudinal models provided support for a positive reciprocal feedback process between hope and the satisfaction of the need for competency. The one year lagged effects between hope and the needs for autonomy and relatedness were not statistically significant, but synchronous relations did exist. The study suggested that perceived vocational competencies lead to increases in the character strength hope, while the trainees' hope in turn also had positive effects on the development of perceived vocational competencies.

Introduction

Empirical research suggests that hope is associated with various valued outcomes at the workplace like employee satisfaction (Adams et al., 2002), commitment (Adams et al., 2002), creativity (Rego, Machado, Leal, & Cunha, 2009), performance (Peterson & Byron, 2008) and development of vocational competencies (Wandeler, Lopez, & Baeriswyl, submitted). The research about psychological capital has reported positive relations among hope and supportive climate, performance, satisfaction, and commitment (Luthans, Avolio, Avey, & Norman, 2007; Luthans, Avolio, Walumbwa, & Li, 2005; Luthans, Norman, Avolio, & Avey, 2008) and negative associations with absenteeism (Avey, Patera, & West, 2006). High-hope employees tend to be more energized to persist in their particular goal achievements and should be readily able to find alternative routes to attain their work-related goals when their usual routes are blocked (Adams et al., 2002). Among the 24 character strengths in the Values in Action Inventory of Strengths (Peterson & Seligman, 2004) hope correlated the highest with satisfaction in life in three different samples of adults (Park, Peterson, & Seligman, 2004).

These general and workplace specific relations to desirable effects lead to the question: how can hope be nurtured at the workplace?

Snyder (1994, 2000a, 2002) has extensively described a general theoretical process of development of hope and demonstrated numerous ways of raising hope in various domains of life (psychotherapy, education, health, work, etc.), and in diverse samples (children, elderly, athletes, students, etc.). The development of hope at the workplace has been addressed by interventions targeting individuals (e.g., Lopez et al., 2004; Luthans & Jensen, 2002) and studies examining the characteristics of high-hope organizations and high-hope employees in order to deduce hope promoting factors (Adams et al., 2002).

The present study combines hope theory (HT; Snyder, 2002) with core ideas of self-determination theory (Deci & Ryan, 1985) in order to examine how certain characteristics of workplaces relate to levels of hope.

First, HT's postulations about the favorable environments for the development of hope converge to a great extent with the environmental conditions self-determination theory (SDT; Deci & Ryan, 1985) suggests for optimal human development. SDT can enrich HT by providing a detailed theoretical and extensive empirical framework. Previous cross-sectional research suggested that the favorable characteristics of environments described by SDT are positively related to higher levels of hope (Wandeler, Baeriswyl, & Shavelson, in press).

Second, SDT can fill a gap in HT by focusing on why goals are pursued and how self-concordance of goals (Sheldon & Elliot, 1999) can fuel agency.

The present field study starts to investigate the combination of HT and SDT by examining the reciprocal effects between hope and environmental aspects in the naturalistic setting of vocational training.

Hope – a Character Strength

Snyder (1995) defines hope as "the process of thinking about one's goals, along with the motivation to move toward those goals (agency), and the ways to achieve those goals (pathways)" (p. 355). This process of hopeful thinking is directed toward personally valued goals (Snyder, 2002; Snyder et al., 1991). The progress in the goal-pursuit is monitored and the resulting emotional feedback regulates behavior, as well as agency and pathways thinking. Hope is not an emotion but rather a dynamic cognitive motivational system (Snyder et al., 1991) and has been operationalized as a trait and as a state (Snyder, 2000b).

Hope is closely related to constructs like self-efficacy, optimism, resilience, and generalized well-being, but results of factor analyses have empirically supported

the theoretical differentiation (Luthans et al., 2007, Magaletta & Oliver, 1999). While for example self-efficacy is related to a particular task, context and domain (Bandura, 1997), hope is very general and more oriented towards a yet uncertain future.

The Development of Hope

Hope, and the goal-directed thinking which underlies it, are thought to be teachable and learnable (Snyder, 2000a, 2002). Specific interventions have been developed to increase hope in individuals and teams (Lopez et al., 2004); however, the present study focuses on the environment's role in the development of hope. Snyder (2000a) suggested that the essential underpinnings of hope are established in early childhood and fostered by social environments in which hopeful thinking and behavior is modeled and encouraged. Mentors can serve as role models and help individuals to come up with their own ideas of how to overcome obstacles.

Obstacles are viewed as important opportunities to learn how to apply hopeful thinking to blocked goals, build up frustration tolerance and develop high-hope thinking.

Hope is additionally fostered when people are allowed the freedom to set their own goals, learn how to break large goals into smaller steps, experience the problems encountered in reaching them, and make some mistakes, which should be seen as positive learning experiences (McDermott & Hastings, 2000).

The accumulation of experiences in such an environment will eventually lead to a core self-belief that the individual is capable of generating pathways and can sustain the energy necessary to pursue goals.

SDT

The Satisfaction of Basic Psychological Needs

Whereas HT focuses more on the *how* of goal pursuit, the SDT addresses *why* a goal is pursued, and emphasizes the importance of developing an autonomous orientation towards the world, where behavior is intrinsically motivated and coherent with one's values. Empirical research on SDT has identified three universal psychological needs; autonomy, competence, and relatedness.

Environments which facilitate the satisfaction of these innate psychological needs will lead to higher intrinsic motivation and personal growth; when these needs are not satisfied, diminished motivation and lower well-being are likely to result (Ryan & Deci, 2000). Intrinsic motivation has empirically shown to be advantageous for effective performance of complex tasks and is related to psychological health, higher levels of psychological well-being, healthier lifestyles, and less burnout at work (Deci & Ryan, 2008).

Autonomous Motivation at the Workplace

Work confronts humans with external demands. To what degree these external demands are internalized and an intrinsic or autonomous work motivation emerges depends on the social environment and individual differences (Gagné & Deci, 2005). Gagné and Deci (2005) differentiate the work environment into aspects of job content and context (i.e. challenge, choice, rationale, feedback) and work climate (managerial autonomy support). The more these aspects of the environment satisfy the basic psychological needs, the better the conditions for autonomous motivation to emerge.

In fact, the very core of craftsmanship and professional pride has a strong component of autonomous motivation when it is defined as "an enduring, basic human impulse, the desire to do a job well for its own sake" (Sennett, 2008, p. 9).

People's self-evaluative processes of their own performance can constitute an important intrinsic reward, bring them a sense of fulfilment, and create personal incentives for accomplishments (Bandura, 1997).

Integrating HT and SDT

The Fundamental View of the Human Being and Development

HT and SDT both presuppose that humans have inherent growth tendencies and self-motivation (Deci & Ryan, 2000), and are intrinsically goal-directed (Snyder, 1994). HT and SDT both view similar social environments as beneficial for favorable development. The described hope-promoting parental behavior (reducing initial assistance in correspondence to growing skills while keeping support available) parallels autonomy-supportive behavior and promotion of self-determination within the framework of SDT (Ryan & Deci, 2000; Snyder, 2000a).

HT does not explicitly assume basic psychological needs like the SDT, but implicitly HT assumes that humans need hope for healthy functioning. Thus the need to believe in having viable paths and energy to achieve goals can be seen as quite similar to the SDT's need for competence.

High Hope – an Intrinsic Motivation?

HT does not explicitly address reasons for action, but mentions the close relation between the strength of hope and the nature, meaning and personal value of goals (Snyder, 2002; Snyder et al., 1991). Hope directed toward intrinsically motivated goals is more positively related to well-being (Cheavens, 2000) and academic achievement (Snyder et al., 2002) than hope focused on externally motivated goals. This parallels the SDT-related research of Sheldon and Elliot (1999), which showed that self-concordant goals ─which are defined as goals consistent with a person's developing interests and core values─ produce greater

well-being benefits, are pursued with more sustained effort, and thus are more likely attained.

Self-concordant goals are therefore likely associated with deeply rooted, energizing agency thoughts, necessary to sustain action, and spur the necessary pathways thinking to overcome barriers in the goal attainment process. Since hope is always goal-directed (Snyder, 2000), the goal-structure underlying hope and the self-concordance of those goals should be crucial for the degree of agency that the goals fuel.

It consequently fits the picture that descriptions of high hope people and intrinsically motivated people converge in numerous ways (Ryan & Deci, 2006; Snyder, 2000a). Furthermore, self-actualization has been found to be strongly associated with both hope (Sumerlin, 1997) and autonomous orientation (Gagné & Deci, 2005).

HT and SDT also both have explanations for a lack of motivation and negative outcomes. Constant frustration of goal pursuits can lead to lower perceived agency and fewer pathways. Very low levels of hope can lead to apathy, a state in which people give up all goal pursuits and are depressed (Rodriguez-Hanley & Snyder, 2000). Similarly, SDT postulates that non-satisfaction of the three basic needs leads people to perceive a loss of control or an external locus of control, which results in a lack of the intention to act and low sense of efficacy (Gagné & Deci, 2005).

High-hope Workplace – Satisfaction of Psychological Needs

HT's theoretical recommendations about how to set up work environments (Snyder & Feldman, 2000) and the characteristics of high-hope workplaces derived from a qualitative survey (Adams et al., 2002) in essence suggest promoting hope through the satisfaction of peoples' basic psychological needs. The portrayed high-

hope companies have positive atmospheres, care for their employees, invest in them, and thus promote relatedness. Adams et al. (2002) assert that shared goals and tasks lead to an increased sense of social support and may help employees to internalize a sense of hope. Employees are included in making company goals, and are given opportunities and to make decisions and mistakes. They are given responsibility for finding solutions to problems and implementing new ideas.

Environments with these characteristics should foster the needs for competence and autonomy, as well as infuse the workplace with greater meaning. The characteristics of high-hope organizations are similar to those of companies a high-involvement approach (Lawler, 1992).

Developmental Model of Hope and Research Questions

Before laying out the research questions two underlying assumptions of the present study need to be clarified.

First, a triadic reciprocal deterministic approach is adopted (Bandura, 2008); the functioning of the individual is seen as a result of a reciprocal interplay between intrapersonal, behavioral, and environmental influences. Personality and work conditions can influence each other over time (Kohn & Schooler, 1983; Frese, Garst, & Fay, 2007).

Second, the effects of job conditions on personality are viewed as learning-generalization processes (Kohn & Schooler, 1983), which entail learning from the job and generalizing those lessons to off-the-job realities. Adams et al. (2002) assume that high-hope employees are likely to be hopeful in their personal lives, because of the strong relation between purpose in life and hope, and work being a prominent source of sense of purpose.

Considering these processes and relationships among HT and SDT, and their relevance to the vocational training context, the following research questions emerged.

Research question 1: How stable are the rankings of individuals in hope and the three psychological needs of SDT over a three year period of a vocational training program?

Examining aggregate change in hope provides important information about the concept specifications of the hope construct. High stability coefficients together with constant mean values would support the idea of hope as being rather stable throughout this period of late adolescence. Low stability coefficients on the contrary would suggest that hope is quite variable during this three year period of vocational training and that the ranking of individuals varies substantially. Stability coefficients and means of hope will shed light on this question.

One benchmark to evaluate the stability is prior research, which has showed test-retest correlations of trait hope ranging from r = .73 to .82 across 8 to 10-week intervals (Snyder et al., 1991), and autoregressive coefficients of β = .73 to .82 for latent agency and pathways components with 4-week time lags (Arnau, Rosen, Finch, Rhudy, & Fortunato, 2007). Due to the longer time frame investigated the stability of trait hope is expected to be lower than in prior research with shorter time frames.

Another type of benchmark is provided by the stability coefficients of the psychological needs in the present study. The needs are expected to be less stable over time than hope because they reflect situational information about the work environment.

Hypothesis 1a: Hope will demonstrate higher stability over the three years of the present study than the psychological needs.

Hypothesis 1b: The degree of stability of hope will be lower than in previous research with shorter time frames.

Research question 2: How are hope and the three psychological needs of SDT interrelated over time?

The presence of positive cross-lagged effects leading from the satisfaction of each of the SDT needs to hope would be consistent with the idea that the satisfaction of needs promotes hope. The hypothesis is that the perceived satisfaction of needs in the work environment has a positive influence on hope one year later.

Hypotheses 2: Competency (2a) / Autonomy (2b) / Relatedness (2c) each has a positive influence on hope one year later.

But the other causal directionality is just as plausible. Hope theory postulates that high hope people perceive an environment in a more positive way, see more pathways and engage more energetically. Consequently it is likely, that high hope people actually interact with their environment and shape it in ways which lead to modified conditions with higher need satisfaction. Earlier levels of hope thus could simply predict future perceptions of situations, or/and indicate actual influencing of environments over time. Unfortunately, with the present data we can not isolate the relative contributions of each process.

In turn, the presence of positive cross-lagged effects leading from hope to the satisfaction of each of the SDT needs would support the view that hope is antecedent of the satisfaction of these needs.

Hypotheses 3: Hope has a positive influence on competency (3a) / autonomy (3b) / relatedness (3c) one year later.

Taken together, hypotheses 2 and 3 suggest that the effects of hope and the SDT needs on each other are reciprocal, reflecting a feedback spiral (Wandeler, Baeriswyl, & Shavelson, submitted).

Method

Sample

The current longitudinal questionnaire study included three annual waves of measurement that were completed by German-speaking Swiss polymechanic trainees. During the four-year training program the polymechanics learn on the job at their company and attend a vocational school for at least one day a week.

The training consists of two years basic training where the fundamental professional skills are learned. During the third and fourth year the trainees specialize in their particular companies activities. While the two first years are rather closely guided, the last two years are more open and the situation resembles more the future life as a professional.

The measurements took place in March of three consecutive years. Since training years start at the end of august, the first measurement took place about half a year into the training. The last measurement took place about 15 month before the end of the training.

The respondents selected for this analysis consisted of the trainees who were part of the first-year training cohort at the time of the first wave of measurement (N = 414). The trainees were on average 17.40 years old (SD = .84) at the first wave of measurement. 80.9% were native German speakers, and 96.6% were male. There were no significant differences due to gender or native language in the trainee variables used for the models.

Procedure

The potential participants were contacted through the two biggest associations of the Swiss mechanical industry, which provided contact information and encouraged their members to participate. The participating trainees either filled out paper and pencil questionnaires administered by their regular trainers in the work

context during work hours, or they completed an identical online version of the questionnaires if computers were available at the workplace. The same process was followed for all three measurement waves.

Measures

Hope. Hope was measured with a previously tested backtranslated German version (Wandeler, 2003) of the Adult Dispositional Hope Scale (Snyder et al., 1991). The eight items of the hope were measured with a 6-point Likert-type scale ranging from 1 (definitely false) to 6 (definitely true). The hope construct consists of two subscales with four items each: pathways or ways (e.g., "Even when others get discouraged, I know I can find a way to solve the problem.") and agency or will (e.g., "I energetically pursue my goals."). In the present study, internal consistency for the dispositional hope scale was satisfactory (Cronbach's αs: Time 1 = .73, Time 2 = .79, Time 3 = .77).

Relatedness. The two items were developed to measure the quality of the relationship between the trainees and trainers (Baeriswyl, Wandeler, & Oswald, 2006). These two items read as follows: "In general the relationships between trainers and trainees are very good in our company" and "My relationship with my trainer is very good." The items were answered on a 4-point Likert-type scale ranging from 1 (definitely true) to 4 (definitely not true). The internal reliability satisfactory (αs: T1 = .69, T2 = .80, T3 = .81).

Autonomy. This scale was originally included in Hackman and Oldham's (1975) Job Diagnostic Survey. A German translation was adapted by Scharnhorst et al. (2006) to fit the targeted population of the study. The three items are: "My work provides me with numerous occasions to decide how to proceed."; "How much independence do you have at work?" and "I have no possibility to contribute personal initiative and to be autonomous at the workplace. (Recoded Item)". The

internal consistency was low for the first and third wave (αs: T1 = .48, T2 = .69, T3 = .53). The face validity of the underlying items was sound and indicated a quite broad measure of autonomy, which should reflect considerable external validity.

Competence. This scale was developed for the present project to measure self-perceived competency as a polymechanic (Frey & Balzer, 2005). The scale consisted of three subscales which measured distinct areas of competency as a polymechanic (manual techniques, techniques using machines and assembly techniques). The trainees were asked to rate how well they performed 25 different professional skills on a 5-point Likert-type scale ranging from 1 (badly) to 5 (well) (25 items; e.g., "Producing parts by hand", "Choosing the right tools and prepare them", "Interpreting assembling instructions"). For the present analysis the global self-reported competency was of interest, thus the subscales were used as indicators. The internal consistency of the scale was satisfactory (αs: T1 = .69, T2 = .80, T3 = .73).

Missing Data and Attrition Analysis

In longitudinal modeling missing data of a subject can be partially missing at a wave of assessment (i.e., certain items missing) or all the items of a particular wave of measurement are missing. The present study included three yearly waves of measurement (see Table 4).

One concern in the interpretation of longitudinal data analyses is a non-random dropout of participants. Interpretations and conclusions can be biased if attrition is connected to meaningful reasons, such as particular characteristics of the persons or their environments. In the present study, at each wave participation was voluntary, dependent on the consent of the company, and was administered by the trainer. Therefore non-participation at any given wave could be due to numerous reasons, and does not necessarily indicate drop out of the training.

In order to screen for obvious effects of attrition, the means of time 1 (T1) scores for background variables and variables in the models were compared for participants who were retained at time 3 (T3) (n = 124) with those who were absent at T3 (n = 175). The trainees who responded at T3 were slightly, but significantly younger at T1 (M = 17.23, SD = .68) than the non-respondents (M = 17.51, SD = .92), $t(297) = -2.88$, $p < .01$, and they were more often native German speakers (88.2% vs. 75.7%, $\chi^2_{(1, 288)} = 7.06$, $p < .01$). In regard to the variables included in the models, there were no statistical differences at T1 between respondents and non-respondents.

Table 4

Sample sizes for the different participation patterns

Pattern of participation	N		
	t1	t2	t3
t1t2t3		113	
t1	93		
t2		44	
t3			36
t1t2		83	
t1t3	11		
t2t3			34
Total	*300*	*274*	*194*

The initial sample dropped from T1 (n = 300) to time 2 (T2) (n = 196) to T3 (n = 124), but over time new respondents also joined the sample (see Table 1). To determine whether these new respondents differed from the initial respondents, the initial respondents who also responded at T3 (n = 124) were compared to the respondents at T3 who had not responded at T1 (n = 70). The only difference was a

significantly higher relatedness for initial respondents ($M = 3.38$, $SD = .59$) compared to respondents joining later ($M = 3.05$, SD = .77), $t(175) = 3.11$, $p < .01$.

Based on these analyses missingness at random (MAR) was assumed (see Little & Rubin, 1987) and missing data were handled using the full information maximum likelihood procedure (Enders & Bandalos, 2002; Raykov, 2005), which is similar to multiple imputation methods and equally effective (Schafer and Graham, 2002).

Statistical Analyses

In order to examine the reciprocal effects between hope and the indicators of needs satisfaction, three separate three-wave autoregressive cross-lagged models were estimated using AMOS 6.0 (Arbuckle, 2005). The three structural equation models consisted of the latent construct hope at the three different measurement waves and each included one need satisfaction construct at all three measurement waves.

When a flexible view of personality is adopted, temporal instability can reflect either true psychological change or measurement error (Watson, 2004). To correct the latent constructs for measurement error the measurement model was explicitly modeled. Although autoregressive cross-lagged models are widely used, the statistical assumptions underlying these models have been subject to criticism (Rogosa, 1988; 1995). One critique is that autoregressive models assume fixed effects for all individual units under investigation and reflects group changes only. Another critique asserts that these models do not account for absolute changes in individual scores for a construct of interest.

Measurement model. All constructs were treated as latent factors with two indicators for relatedness and three indicators for autonomy and competence. The eight indicators for hope were reduced to four parcels to obtain a more parsimonious

model and because the structural paths between latent variables were of more interest than the measurement model and the individual items (Little, Cunningham, Shahar, & Widaman, 2002). The method of parceling was applied following Kishton and Widaman (1994).

First, the cross-sectional factorial structure was tested via confirmatory factor analysis (CFA) for all three measurement waves in order to assure that hope was empirically distinct from the three needs and that cross-lagged models were appropriate. At all measurement points the comparison of fit indices indicated that a 4 factor model fitted the data better than any of the three different 3 factor models were hope was merged alternatively with one of the needs (see Table 5).

Table 5

Model fits of confirmatory factor analyses at the three measurement waves T1, T2, T3 for hope (h), competency (c), autonomy (a) and relatedness (r).

	Model	$\chi 2$	df	p	$\chi 2$/df	RMSEA	CFI	TLI
T1	4 correlated factors (h, c, a, r)	49.62	48	.41	1.03	.01	1.00	1.00
	3 correlated factors (‘h & c’, a, r)	228.19	51	.00	4.47	.09	.78	.67
	3 correlated factors (‘h & r’, c, a)	126.55	51	.00	2.48	.06	.91	.86
	3 correlated factors (‘h & a’, c, r)	92.69	51	.00	1.82	.04	.95	.92
T2	4 correlated factors (h, c, a, r)	55.04	48	.23	1.15	.02	.99	.99
	3 correlated factors (‘h & c’, a, r)	262.16	51	.00	5.14	.10	.80	.70
	3 correlated factors (‘h & r’, c, a)	201.35	51	.00	3.95	.08	.86	.78
	3 correlated factors (‘h & a’, c, r)	178.57	51	.00	3.50	.08	.88	.82
T3	4 correlated factors (h, c, a, r)	100.37	48	.00	2.09	.05	.92	.87
	3 correlated factors (‘h & c’, a, r)	231.30	51	.00	4.54	.09	.73	.59
	3 correlated factors (‘h & r’, c, a)	197.96	51	.00	3.88	.08	.78	.66
	3 correlated factors (‘h & a’, c, r)	150.61	51	.00	2.95	.07	.77	.85

Second, for each of the three longitudinal models the factorial structure was tested again via CFA. The residuals of corresponding indicators were allowed to correlate across measurements to account for variations due to disturbances specific to the item (Little, Preacher, Selig, & Card, 2007). In order to empirically test if the fundamental meaning of the constructs changed and the respective indicators

represented the same construct over time, tests for weak factorial invariance (i.e., the structure of the models and relative loadings of the factors do not differ) were conducted (Little et al., 2007).

The overall fit of the CFA for the model with hope and competency with the factor loadings set to equal for the constructs across time points was satisfactory ($\chi 2$ = 196.57, df = 163, p = .04, $\chi 2/df$ = 1.21, $RMSEA$ = .02, CFI = .98, TLI = .98) and did not fit the data significantly worse than the model with free factor loadings for the constructs across the three time points ($\chi 2$-difference = 14.68, df = 10, p = .14).

The fit for the CFA model of hope and autonomy was adequate ($\chi 2$ = 205.08, df = 163, p = .01, $\chi 2/df$ = 1.26, $RMSEA$ = .02, CFI = .97, TLI = .96) and factorial invariance was supported as well ($\chi 2$-difference = 14.04, df = 10, p = .17).

Also the fit for the CFA of the hope and relatedness model was satisfactory ($\chi 2$ = 136.91, df = 110, p = .04, $\chi 2/df$ = 1.24, $RMSEA$ = .02, CFI = .98, TLI = .97) and factorial invariance was justifiable ($\chi 2$-difference = 13.42, df = 8, p = .10). The primary criterion for panel models, the weak factorial invariance was fulfilled for all three models (Little et al., 2007).

Results

Descriptive Analyses

The means, standard deviations, and correlations for the manifest variables hope, relatedness, autonomy, and competency are documented in Table 6. All the constructs were clearly above their theoretical midpoints.

Table 6

Means, standard deviations and correlations of the manifest variables hope, relatedness, autonomy and competency at the three measurement points t1, t2, t3

	Variable	N	M	SD	1	2	3	4	5	6	7	8	9	10	11
1	Hope t1	295	4.74	0.52											
2	Hope t2	265	4.67	0.55	.47***										
3	Hope t3	189	4.74	0.52	.38***	.62***									
4	Relatedness t1	282	3.56	0.49	.31***	.17*	.10								
5	Relatedness t2	247	3.33	0.61	.18*	.33***	.10	.26**							
6	Relatedness t3	177	3.26	0.68	.12	.16	.29***	.49***	.20*						
7	Autonomy t1	286	5.00	0.91	.26***	.15*	.19*	.26***	.23**	.21*					
8	Autonomy t2	262	5.17	0.95	.24**	.31***	.14	.06	.37***	.10	.35***				
9	Autonomy t3	184	5.16	0.98	.22*	.28**	.21**	.13	.33***	.26**	.36***	.38***			
10	Competency t1	293	4.09	0.44	.36***	.35***	.24*	.21***	.27***	.13	.29***	.29***	.17		
11	Competency t2	267	4.09	0.51	.23**	.36***	.27**	.24**	.32***	.35***	.13	.33***	.34***	.44***	
12	Competency t3	193	4.22	0.49	.11	.40***	.36***	.01	.25**	.22**	.07	.12	.23**	.33***	.33***

Note. * p < .05. ** p < .01. *** p < .001.

Research Question 1: Temporal Stability of hope and the three psychological needs of SDT

To investigate the research question about the temporal stability over autoregressive paths were introduced between the consecutive measures of each construct (e.g.; from hope at T1 to hope at T2, and hope at T2 to hope at T3). Since theoretically there was no reason for an effect to take place from T1 to T3 above the effects of T1 on T2 and T2 on T3, a first-order Markov chain was implemented and no second-order effects were specified.

Autoregressive paths indicate to which degree the relative rank order of the individuals changes, are generally seen to represent how stable the construct is from one time point to the next, and are thus referred to as stability coefficients (e.g., Finkel, 1995). In order to test if the stability changed over time, for each construct an unconstrained autoregressive model was compared to a model with autoregressive paths constrained to be equal.

Stability of hope. The stability of hope in the three models was moderately high ($\beta_{t1\ t2}$ = .48 - .58, p < .001; $\beta_{t2\ t3}$ = .69 - .70, p < .001) and pointed to a certain degree of change in rank order of the individuals during the period under study (see Figures 1, 2, and 3). The varying stability of hope across the different models was due to the cross-lagged influence of the respective need. Although hope tended to be more stable later in the training, the χ^2-difference test between the model with stability coefficients set to equal and the unconstrained model was not significant (χ^2-difference = .08 p = .78). This suggested that the stability of hope between the first and the second year was not statistically significantly different from the stability between the second and the third year.

The manifest means were at a similar level at all three measurement points, indicating that mean levels of hope in the current sample stayed relatively stable over time.

Stability of needs satisfaction variables. The stability of competency was moderate (see Figure 1). The non-significant χ^2-difference test indicated similar stabilities (χ^2-difference = 1.69, p = .19). The stability of autonomy was also moderately high, and not significantly different across time (χ^2-difference = 1.10 p = .29) (see Figure 2). Relatedness was the least stable (see Figure 3) and the stability was similar between the three waves (χ^2-difference = .60 p = .44).

On the surface, the manifest means of autonomy and competency displayed an increasing tendency, relatedness on the other hand showed a decreasing tendency. However, differences among these means were not tested since the models did not meet the necessary criterion of strong factorial invariance.

Research Question 2: Longitudinal Relationships among Hope and the Basic Psychological Needs

The research question about the longitudinal relationships among the constructs was addressed by introducing cross-lagged paths between the constructs. Because the influences of prior time points of the same construct were accounted for by the autoregressive paths (e.g., hope at T1 on hope at T2), the cross-lagged effects indicated the separate influence of the other construct (e.g., autonomy at T1 on hope at T2), and aimed at explaining the degree to which changes in one construct (e.g., hope) were attributable to the other construct (e.g., autonomy). Thus the cross-lagged effects can be interpreted as adding predictive power over and above the influence of the earlier measure of the constructs.

The residuals of the constructs (curved double-headed arrows) were allowed to correlate to reflect variation not already accounted for by latent variables from earlier time points. The factor structure and loadings of the constructs were specified in the same way for the three waves (Little et al., 2007).

Longitudinal relations between hope and competency. Competence at T1 had a statistically significant cross-lagged effect on hope T2 ($\beta = .19$, $p = .03$). In contrast between T2 and T3 the influence of hope on competency was stronger ($\beta = .32$, $p < .001$). Remarkably, T3 competency was predicted almost as well by T2 hope as by the prior level of competency at T2 ($\beta = .40$, $p < .001$). The indirect effect from T1 competency via T2 hope on T3 competency was rather small ($\beta = .06$). The initial significant positive correlation between hope and competency ($r = .52$) was quite high. The correlations between the residuals at the latter measurement points were lower (T2 $r = .34$, T3 $r = .23$), but indicated that a quite substantial part of the association was not explained by prior levels of hope and competency.

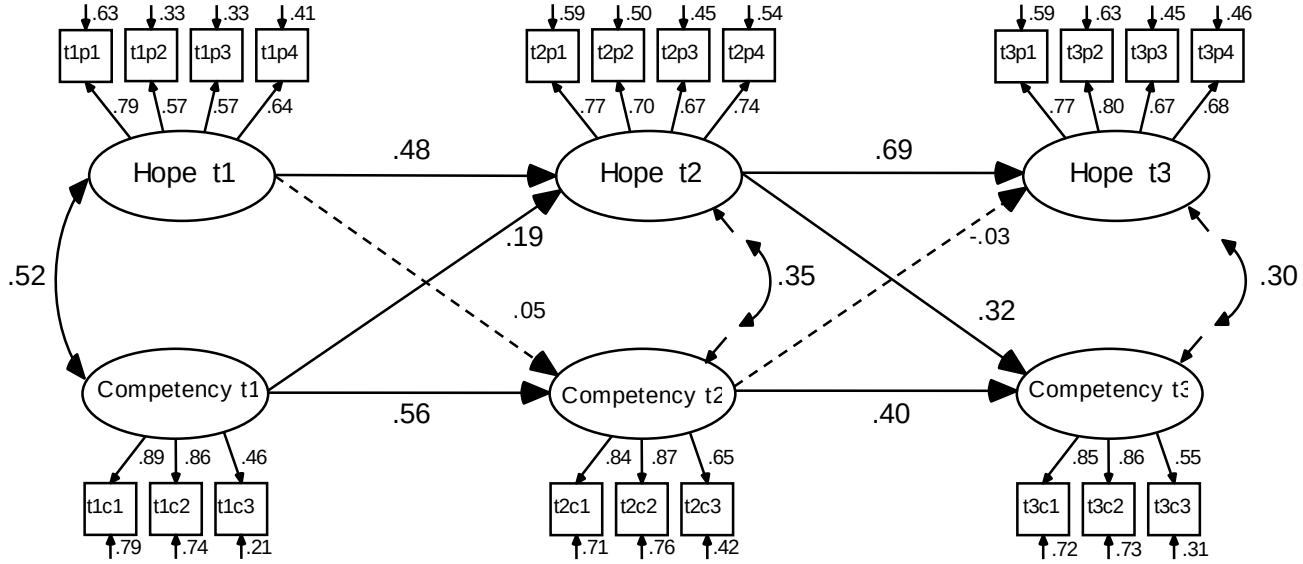

Figure 3. Latent autoregressive cross-lagged model for hope and competency. All regression coefficients are standardized. Bold paths represent statistically significant coefficients at $p < .05$. Dotted paths indicate modeled, but non-significant coefficients. Double-headed arrows represent correlations between residuals (or correlation between constructs at t1). Residuals of corresponding indicators were allowed to correlate freely over time, but are not displayed in the figure. Stability coefficients are unconstrained. Factor loadings of respective indicators were set equal across all time points, except hope parcel 2.

Longitudinal relations between hope and autonomy. The cross-lagged effects between autonomy and hope were not significantly different from zero. While the cross-lagged coefficients were very low between T1 and T2, the cross-lagged effect from T2 hope to autonomy T3 ($\beta = .19$, $p = .11$) was marginally higher (*z*-statistic = 1.65) than the path from T2 autonomy to T3 hope ($\beta = -.06$, $p = .56$). The significant positive latent correlation between hope and autonomy ($r = .44$) at the initial measurement point was followed by lower correlation between the residuals at T2 ($r = .28$), and at T3 this correlation was not statistically significant anymore ($r = .15$).

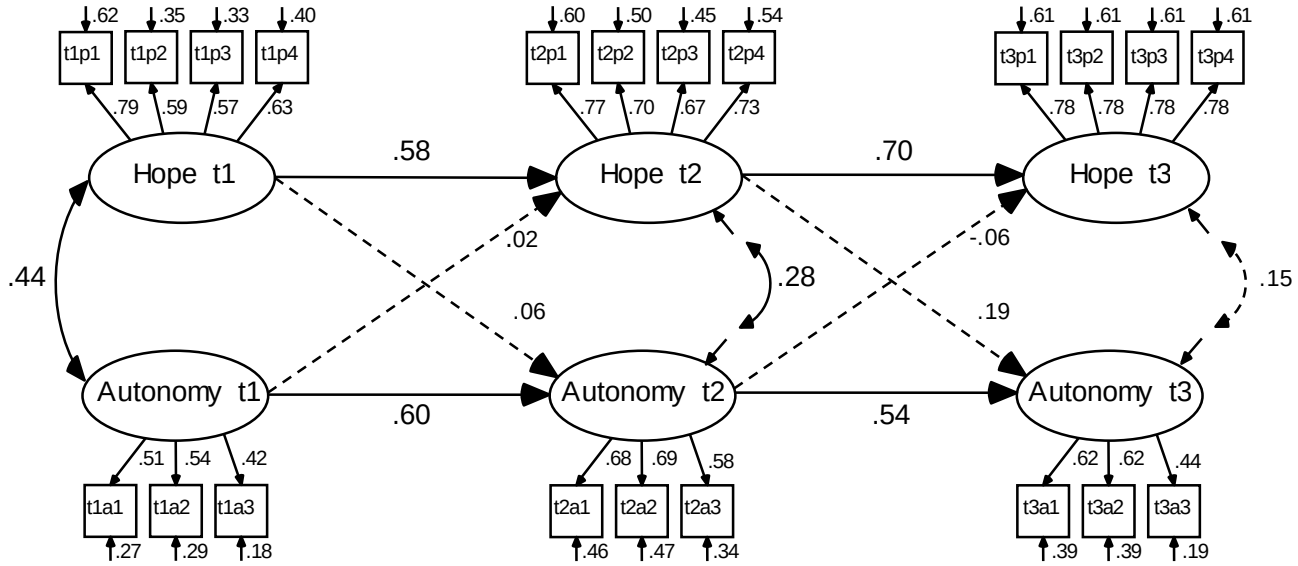

Figure 4. Latent autoregressive cross-lagged model for hope and autonomy. All regressions coefficients are standardized. Bold paths represent statistically significant coefficients at $p < .05$. Dotted paths indicate modeled, but non-significant coefficients. Double-headed arrows represent correlations between residuals (or correlation between constructs at t1). Residuals of corresponding indicators were allowed to correlate freely over time, but are not displayed in the figure. Stability coefficients are unconstrained. Factor loadings were set equal across all time points, except hope parcel 2.

Longitudinal relations between hope and relatedness. The cross-lagged effects between relatedness and hope were likewise not significantly different from zero. While the cross-lagged coefficients were very low from relatedness to hope (β = .02, p = .99 and β = .00, p = .96), the cross-lagged effects from hope to relatedness (β = .17, p = .11, and β = .21, p = .06) were marginally significant, but not statistically significantly higher (z-statistics = 0.8 and 1.43, respectively). The correlation at the initial measurement point (r = .47) was followed by lower latent correlations between the residuals (T2 r =.34, T3 r = .23); thus a substantial part of the constructs relation was not explained by prior levels of hope and relatedness.

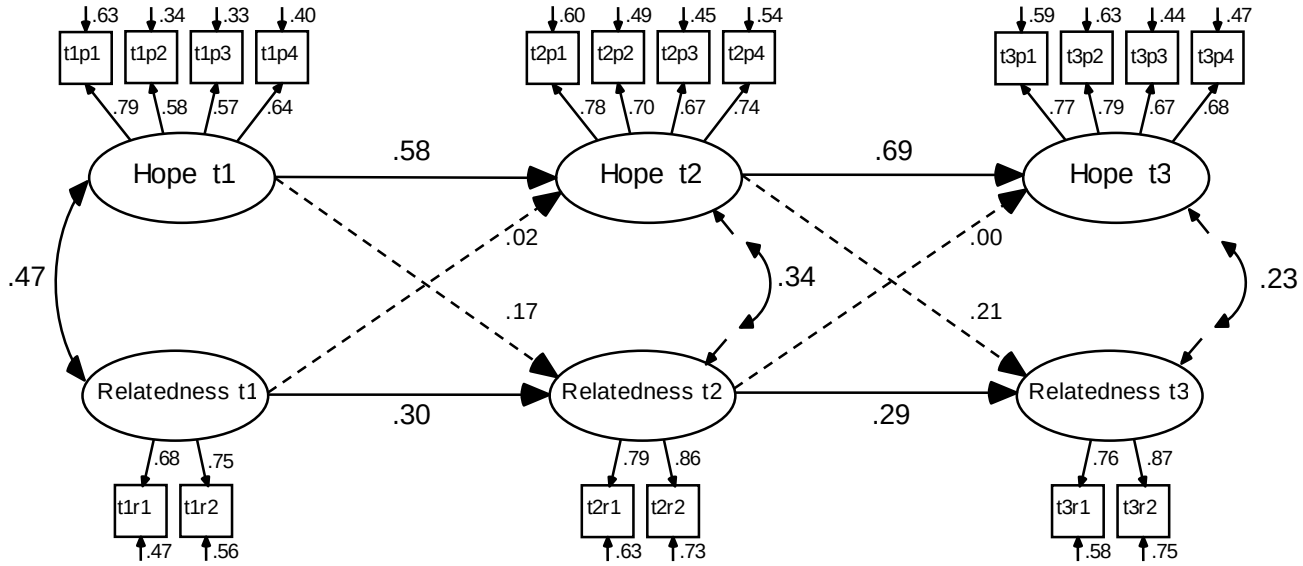

Figure 5. Latent autoregressive cross-lagged model for hope and relatedness. All regressions coefficients are standardized. Bold paths represent statistically significant coefficients at $p < .05$. Dotted paths indicate modeled, but non-significant coefficients. Double-headed arrows represent correlations between residuals (or correlation between constructs at t1). Residuals of corresponding indicators were allowed to correlate freely over time, but are not displayed in the figure. Stability coefficients are unconstrained. Factor loadings were set equal across all time points, except hope parcel 2.

Discussion

The goal of the study was to investigate the reciprocal longitudinal relationships of hope with the satisfaction of the basic psychological needs —autonomy, relatedness, and competency— during vocational training. Results of three autoregressive cross-lagged structural equation models partially supported the hypotheses, and underlined the importance of investigating synchronous relations over longer periods of time in order to gain more knowledge about causal relations.

First Research Question: Stability of individuals' ranking in Hope and the Basic Psychological Needs

The ranking of individuals in hope was rather stable, but as expected less stable than reported stabilities from previous studies with much shorter time frames (Arnau et al., 2007, Snyder et al., 2002). Thus, although the sample means of hope were at roughly the same levels over time, the stability coefficients did indicate

changes in rank order of the individuals and pointed to the possibility of individual change, which is in line with theory and empirical findings of interventions targeting the increase in hope (Lopez et al., 2004; Luthans & Jensen, 2002; Snyder, 2000b). Hope had a higher stability than the basic psychological needs, which indicates that people changed less in rank order of hope than in perceived autonomy, competency, and relatedness. The comparisons of the stabilities thus validate the notion that hope is trait-like; relatedness, as the least stable need, was the most closely tied to the situational social environment; competency and autonomy were in between these two levels of stability.

Second Research Question: Effects among Hope and the Basic Psychological Needs

The cross-lagged models suggested that the satisfaction of the needs of autonomy and relatedness did not have a direct effect on hope one year later. A speculative explanation could be that effects of autonomy and relatedness on hope are very situational and happen within much shorter timeframes than one year. Another speculation could presume the existence of critical developmental phases where hope is particularly impacted by autonomy and relatedness, but that subsequent influences on hope are limited.

However, some of the cross-lagged effects from hope on autonomy and relatedness appeared to be of a meaningful effect size (β = .17 or greater), but the sample size of the present study did not provide enough statistical power for these estimates to reach statistical significance. Trautwein, Lüdtke, Köller and Baumert (2006) argue that beta coefficients for cross-lagged effects in the range of β = .10 – .15 are common in real-world, non-experimental, longitudinal research and can be considered meaningful. Therefore the small statistically non-significant cross-lagged effects of hope on autonomy and relatedness could indicate that longitudinal

influence of hope on the satisfaction of psychological needs exists in reality. Potential explanations could be that hope plays a role in how trainees take a part in shaping future situations, or that hope predicts the perception of situations.

At this point it is also noteworthy that a quite substantial part of the latent correlations remained as residual correlations even after controlling for prior levels of hope and needs. Possible reasons for these remaining associations between the constructs can be unobserved variables influencing hope and the needs, influences occurring within shorter timeframes, or the common method effect of the self-report. The investigated one year time lag is not suited to address more short-term or even synchronous reciprocal influences.

Finally, the hypothesized positive reciprocal effects found some support in regard to hope and competency. The influence between hope and competency flipped over time: higher perceived competency can increase hope and higher hope can in turn increase perceived competency. This can be interpreted as a positive feedback spiral, taking place over long periods of time. The sequencing of these effects however could depend on the chosen measurement points, and locating the initial cause is an empirically challenging venture. Competency at T1 could be predicted by prior levels of hope, which in turn could be predicted by even earlier levels of competency et cetera.

The curriculum of the vocational training could also provide a plausible explanation, because it consists of basic training in the first two years followed by a more specialized training in the third and fourth year. Therefore one could reason that basic competencies at T1 inspire hope at T2, and hope at T2 in turn helps the trainees to deal with the more complex demands and potential difficulties when entering the advanced part of their training in T3. On one hand the reciprocity of the effects underlines the interactive dynamics between domain specific competencies

and more general psychological resources like hope. On the other hand it also points to the potential beneficial effects of hope for the development of domain specific competencies, and dealing with new challenges at the workplace.

Strengths, limitations and future research

Causal inferences. The use of longitudinal designs with multiple measurement waves permits to model effects over time and helps to reduce the limitations of cross-sectional data regarding the disentangling of the directionality of effects. Although longitudinal cross-lagged models provide considerably stronger causal arguments than models based on cross-sectional data, they still do not have the strength of experimental data. Key threats to causal inferences include the exogeneity assumption, the omitted variable problem, and potential confounding of instrumental variables (Little et al., 2007). The true causal agent could be due to events antecedent to the study. Similarly, omitted variables could be the true causal agents which cause variables in the model to covary, giving the appearance of causality.

Also, the use of self-report measures can inflate the strength of connections due to common methods bias (e.g., Doty & Glick, 1998) as well as other limitations inherent to self-report. For example, Kohn and Schooler (1983) suggested that contemporaneous effects of personality on job conditions might not be real, because some of them may reflect the effects of people's personality on their perception of conditions, rather than personality affecting actual conditions of work. Since one of the arguments of HT and SDT is precisely that the perception of situations is influenced by individual characteristics, self-report seems to be an appropriate form of assessment. However, the integration of more objective measures of situations would be strongly desirable, because it would allow examining if personal

characteristics merely influence the perception of situations, or if they also impact the future objective situation.

Furthermore, the reciprocal influences could be explored in more detail through experimental variation of needs satisfaction and levels of hope. To gain a fuller understanding of relations among hope and needs satisfaction in late adolescents and young adults, it would be informative to test participants at more frequent intervals, as well as to integrate measures of state hope, and examine how they pertain to more specific situational work environments.

Because the trainees responded at the workplace and the questionnaire was mainly focused on work-related issues, priming and framing effects could have inflated the degree to which workplace factors are related to general hope of young trainees. A further limitation is the briefness of the SDT measures and that the relatedness measure considered only the relationship to the trainer and not to work colleagues. Future studies could reduce these effects by assessing hope and work-related questions at different times and preferably in different contexts.

Generalizability. Both SDT and HT address general psychological processes and have been successfully applied in different cultures and across various domains; however the generalizability of the findings could be limited to young adolescent male Swiss polymechanics. The large, real-world sample suggests a strong ecological validity.

The very limited number of female polymechanic trainees reflects reality, and although no gender-specific effects were assumed, it would be important to examine differential effects of work environments.

The findings should also be replicated with other professions and age groups. For instance it is unclear, if effects between competency and hope would also exist in a profession with less demanding skills. Furthermore, older adults might show

different effects than young adults, who are still developing their personalities and competencies.

The satisfaction of the basic psychological needs was measured in the present study with specially developed scales; measures developed within SDT research would have facilitated more precise comparisons.

Practical implications

Vocational training is not only about successfully learning the skills of a profession, but also about being able to cope with change, becoming a member of the workforce, crafting a professional identity and developing as a person. The present study shows that trainees' development of hope can benefit from perceived professional competency, which in turn also positively influences future perceived levels of competency.

The positive synchronous associations between the needs and hope suggest that organizational members with leadership roles should strive to create work environments which facilitate the satisfaction of basic psychological needs, and initiate and sustain positive situational and long-term feedback spirals. Trainers can foster hope and autonomous motivation through autonomy-supportive behavior, displaying confidence in trainees' abilities, and by modeling hopeful thinking and behavior.

Conclusion

The present study has theoretically discussed how the constructs of hope and autonomous motivation come together in many ways, and concluded that satisfaction of the three basic psychological needs—competence, autonomy and relatedness— is partially interrelated with hope. The reciprocal influences of hope with autonomy and relatedness were weak over a one year timeframe. If they do exist, the findings suggest that the effects are likely unidirectional from hope to the needs. The existing

synchronous relations potentially indicate the situational importance of autonomy and relatedness for the creation of an atmosphere where hope, autonomous motivation, and self-concordant goals are nurtured.

The empirical findings support the notion of reciprocal determination between hope and perceived professional competence. The particular importance of the need of competency for hope suggests that work can promote hope by offering the possibility to develop valued professional skills, and hope in turn can play an important role in the development of trainees' perception of their competencies as craftsmen. The recent finding of an effect of hope on development of objective measures of professional competence (Wandeler, Lopez, & Baeriswyl, submitted) demonstrates that the relation is not limited to self-perceived data.

The present study thus empirically supports the latter part of Snyder and Feldman's (2000) recommendation to promote hope by setting up work environments in a way that maximizes the worker's sense of pursuing meaningful goals while gaining satisfaction in doing tasks well. Future research can test the first part of the recommendation and investigate if another aspect of SDT converges with HT and greater self-concordance of workplace goals is related to higher levels of hope.

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Study 3 : Hope, mental health and development of vocational competencies in vocational training

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Prof. Lopez contributed with theoretical comments in regard to hope theory and helped to narrow down a more extensive earlier version.

Prof. Baeriswyl supported the dissertation project and was the responsible project leader for “Qualität und Wirkungsmerkmale der beruflichen Bildung (QuWibB)” within which the data for the dissertation were collected.

Abstract

Hope, mental health, and vocational competencies were examined over 24 months within a four year vocational education and training. A structural equation model based on longitudinal questionnaire data suggested that vocational competency at the end of training was related to levels of hope three months earlier, even after controlling for vocational competency 24 months earlier. Mid training vocational competency was only marginally related to subsequent levels of hope nine month later. The hypothesized cross-lagged effects between hope and mental health could not be found, the constructs nevertheless related synchronously. Higher vocational competency related positively to mental health nine months later.

Keywords: hope, mental health, performance, work, vocational training

Introduction

While the obvious goal of vocational education and training (VET) is to develop vocational competencies, the development of personal and social competencies and the promotion of a healthy development of the person are also essential, because VET generally takes place during the critical developmental periods of the late teens, emerging adulthood, and young adulthood (e.g., Arnett, 2000; Sirsch, Dreher, Mayr, & Willinger, 2009).

The megatrends (globalisation, changes in value systems, and the rise of information and communication technologies) are constantly increasing the quality and scope demanded from VET (Achtenhagen & Grubb, 2001). Even after initial VET the workforce has to be able and willing to learn continuously, deal with uncertainty and contribute creatively to the success of the entire organisation. VET should therefore nurture the psychological resources necessary to develop competencies, deal with an uncertain, demanding future, and stay mentally healthy.

Because VET takes place during important developmental phases it is well positioned to play an important role to foster personal resources for the whole work life and life in general. Hope (Snyder, 2000) is such a psychological resource which helps individuals to deal with hindrances and uncertainty. Hope is also among a small number of constructs which has been shown to be related to a well performing (Peterson & Byron, 2008) and a mentally healthy workforce (Adams et al., 2002). The present study is therefore interested in exploring the role hope plays within VET and investigates the relationships of hope with the development of vocational competencies and mental health.

Hope

Defining Hope

Hope is "the process of thinking about one's goals, along with the motivation to move toward those goals (agency), and the ways to achieve those goals (pathways)" (Snyder, 1995, p. 355). As such, hopeful thinking is goal-directed (Snyder, 2002) and these goals are personally valued (Snyder et al., 1991). The progress in goal-attainment is monitored and the resulting emotional feedback regulates behavior and influences the two components of hope: agency and pathways thinking. Rather than an emotion, hope is considered to be a dynamic cognitive motivational system (Snyder et al., 1991). The hope construct of Snyder et al. does not refer to wishful thinking, as in hoping to win the lottery or hoping for good weather. Hope is the confidence that one will find a way to reach one's goal, although it might not yet be clear how the goal attainment will come about and difficulties along the way are possible. Hope involves believing in oneself, preserving trust despite an uncertain future, and holding constructive convictions that obstacles will be overcome. The hope construct is closely related, but has been reported to be empirically distinctly different from self-efficacy, optimism, resilience, and generalized well-being (Magaletta & Oliver, 1999; Snyder, 2000; Luthans, Avolio, Avey, & Norman, 2007). While for example self-efficacy is related to a particular task, context and domain (Bandura, 1997), hope is very general and more oriented towards a yet uncertain future.

Hope has been linked to numerous positive outcomes at the workplace like employee satisfaction (Adams et al., 2002), commitment (Adams et al., 2002), creativity (Rego, Machado, Leal, & Cunha, 2009) and performance (Peterson & Byron, 2008). Research on psychological capital reveals positive relationships between hope and psychological well-being (Avey, Luthans, Smith, & Palmer,

2010), supportive climate, performance (Luthans, Avolio, Avey, & Norman, 2007; Luthans, Avolio, Walumbwa, & Li, 2005; Luthans, Norman, Avolio, & Avey, 2008), satisfaction (Luthans et al., 2007; Luthans et al., 2008), and commitment (Luthans et al., 2008), and conversely a negative association with absenteeism (Avey, Patera, & West, 2006).

Hope as a Trait

The hope trait scale strives to measure a disposition, whereas the state scale focuses on hope in the present situation (Snyder, 2002). Snyder et al. (1991) report test–retest temporal reliabilities ranging from .85 for 3 weeks to .82 for 10 weeks. The state hope scale has correlated .48 over a 30-day interval and .93 over a 2-day interval (Snyder et al. 1996). Hope as trait is viewed as being rather stable over time but still malleable, because individuals learn from their experience and situational feedback can influence these cognitive motivational structures (Snyder, 2002). Peterson and Seligman (2004) included hope in their list of character strengths and define strengths of character as traits, but also claim that they are malleable. Consequently, the current study used the hope trait scale, but does not adopt a classical psychometric trait model of personality development (e.g., the five-factor theory of personality; McCrae & Costa, 1999), where traits are viewed as being stable after maturity is reached. A more interactional approach is adopted, where the functioning of the individual is seen as a result of a reciprocal interplay between intrapersonal, behavioral, and environmental influences (e.g., the triadic reciprocal deterministic approach by Bandura, 2008). Personality and work conditions can influence each other over time (Kohn & Schooler, 1983; Frese, Garst, & Fay, 2007; Roberts, Caspi, and Moffitt, 2003). The present study thus assumes an interaction between environments and individuals' level of hope, which can potentially result in changes of the trait hope over time.

Hope and the Development of Vocational Competencies

Theoretical Reflections about the Relation Between Hope and Competency in VET

As a dynamic cognitive motivational system (Snyder et al., 1991) hope should relate positively to vocational competency development in VET for multiple reasons.

First, high hope individuals have strong agency thinking. Hopeful trainees have a strong belief that goals are attainable. They are more motivated, energized, and persist in the face of hindrances.

Second, high hope people have strong pathways thinking, which reflects that they generally make out a variety of possible solutions to attain desired goals, and that they are able to develop alternative routes. They expect to potentially having to apply alternative routes and thus view interferences as challenges. Consequently, high hope trainees would be more resilient in the face of obstacles at the workplace, and more creative in finding solutions.

Third, hope is an important cognitive-motivational factor in self-regulation (Snyder, 2002). When framing competency development as a hierarchical structure of ever smaller sub goals (Hacker, 2003) trainees can be seen as coping with action regulation problems in the goal attainment process. The goals in VET range from aims linked to daily work task and clearly defined learning goals to the overarching goal of finishing a four year training successfully. Hopeful thinking should play a role at all those levels.

Fourth, high hope individuals often set more demanding goals, which they strive to achieve (Snyder et al., 2002). Setting more demanding goals during four years of training should result in superior achievement beyond the average competency level. High hope individuals are also more likely to choose learning

goals rather than performance goals (Snyder et al., 2002), which should lead to mastery orientation rather than a helpless orientation (Dweck, 1999).

Fifth, high hope employees can cope better with problems and stressors at work (Peterson & Byron, 2008; Snyder & Feldman, 2000). Therefore hope should help trainees to deal with various sources of stress at the workplace and thus facilitate learning.

Sixth, the development of expertise occurs through reflexive use of knowledge. Thus attitudes and motivational states of the learners play an important role. Through their positive expectation of future outcomes and their perceived personal agency to influence outcomes, hopeful trainees should be able to learn from reflection and also constructively perceive mistakes as learning opportunities.

Competency development however also should have an effect on the level of hope. On one hand, competency development means that individuals expand their action and skill repertoire, thus broadening their pathways thinking. On the other hand, experiences of success in VET generate positive emotions and the feedback strengthens motivation and agency thinking. The accumulation of encouraging experiences in a work environment can be generalized to live in general and can eventually lead to a core self-belief that the individual is capable of generating pathways and can sustain the energy necessary to pursue and attain goals.

Empirical Support for the Relation Between Hope and Competency

Hope has been linked to competence in academics (Curry, Snyder, Cook, Ruby, & Rehm, 1997; Snyder et al., 2002) and athletics (Curry et al., 1997). In a study with adolescents, hope was a significant predictor of grades a year later even after controlling for gender, verbal, and numerical ability (Ciarrochi, Heaven, & Davies, 2007). Higher levels of trait hope predicted higher academic achievement (controlled for previous academic achievement) directly and via higher specific

expectancies for academic performance (Rand, 2009). In three different U.S. samples of employees of varying job levels and industries more hopeful people were rated a year later as higher performing employees by their supervisors, even after controlling for two established predictors of job performance: self-efficacy and cognitive ability (Peterson & Byron, 2008). Further, when Peterson and Byron confronted management executives with a novel and realistic work-related problem scenario, the more hopeful employees generated more solutions and higher quality solutions. The influence of motivational factors on learning success and competency development has been investigated within training and transfer research, where the self-efficacy, which is closely related to hope, has been shown to play an important role in the success of training (Colquitt, LePine, & Noe, 2000) and is positively related to learning motivation and learning.

The detailed dynamics of the effects of hope on performance have been theorized about, and some research exists (Curry et al., 1997; Peterson, Gerhardt, & Rode, 2006; Snyder et al., 2002), but the mechanisms through which hope impacts performance still need further investigation.

Hope and Mental Health

Theoretical Reflection of the Relation Between Hope and Mental Health

Hope is viewed as a cause of mental health, because the mental processes related to hope contribute to the individual's overall health, result in positive emotions, influence behavior related to primary and secondary prevention, and buffer negative effects in the occurrence of stressors (Snyder & Feldman, 2000; Stajkovic, 2006; Valle, Huebner, & Suldo, 2006). Hope can also be viewed as an indicator of adjustment, optimal functioning, and thus mental health. Since mental health is a general indicator of effective human functioning, it would be plausible, that mental

health is not only caused by hopeful thinking, but actually also is a precursor and facilitator of hopeful thinking.

Empirical Findings about the Relation Between Hope and Mental Health

Hope has been shown to be associated with mental health, physical health and well-being (Snyder, 2002), satisfaction in life (Park, Peterson, & Seligman, 2004), and self-actualization (Sumerlin, 1997). Hope is associated with the full range of factors which have been proposed to represent flourishing mental health, even after controlling for optimism hope uniquely predicted life satisfaction, positive affect, as well as most components of psychological, and social well-being (Gallagher & Lopez, 2009). Hope also predicted unique variance of well-being after controlling for levels of general self-efficacy and optimism (Magaletta & Oliver, 1999). College students' hope partially mediated the relationship between attachment and mental health (Shorey, Snyder, Yang, & Lewin, 2003).

Ciarrochi et al. (2007) found that adolescents' hope was correlated positively one year later with teacher-rated positive adjustment, and negatively with behavioral and emotional problems. Adolescents reporting higher initial levels of hope were more likely to report higher levels of global life satisfaction a year later, and appeared to be less at risk for experiencing increases in internalizing behavior problems and reductions in life satisfaction when confronted with adverse life events (Valle et al., 2006). Research at the workplace showed that hope is related to psychological well-being (PWB) and general mental health of employees (Avey et al., 2010). Hope ─as part of positive psychological capital (PsyCap)─ contributed to changes in both measures of mental health three months later. These authors see the results as preliminary evidence that positive psychological resources may over time lead to well-being, but do not address if well-being potentially leads to changes in hope and related variables.

Research gathered thus far provides substantial support for the positive association of hope with indicators of health and the negative association with indicators of illness. Hope has been found to predict some amount of change in positive and negative health indicators, but the predictive value of hope over longer periods of time and the mechanisms underlying these effects still need to be examined in greater detail.

A Resource Model of Hope, Mental Health and Vocational Competencies

Hope, mental health and vocational competencies can be seen as personal resources which help people to deal with stressors at work and sustain increased levels of job performance. According to the second principle of the conservation of resources theory (Hobfoll, 1998), people with resources can increase and sustain their resources easier than people with fewer resources who struggle to build up further resources and are more vulnerable to enter loss spirals. People with resources can enter gain spirals, where gains in resources lead to further gains (Hobfoll, 1998). Higher levels of hope, higher levels of professional performance and higher levels of mental health are characteristics of healthy functioning persons and are resources that interact with each other positively facilitating further increases and stabilizing each other in case of resource loss or threat thereof.

Vocational skills are personal resources, which not only provide economic value, but also enhance psychological resources through their influence on identity and other self-related psychological constructs. People's self-evaluative processes of their own professional performance can constitute an important intrinsic reward bringing them a sense of fulfilment and creating personal incentives for accomplishments (e.g., Bandura, 1997). Work environments promote hope when workers can gain satisfaction in doing tasks well (Snyder & Feldman, 2000). Reaching goals encourages hopeful thinking, as individuals adjust their hopes as they

experience success or failure in pursuing goals (Feldman, Rand, & Kahle-Wrobleski, 2009). People's affective self-reactions to their own performances, professional pride, and the positive emotional feedback in the process of goal pursuit at the workplace can favourably influence hope and mental health. Positive emotions are not only associated with health, but produce health (Fredrickson, 2001). Experiences of problem solving and overcoming difficulties at work can be generalized to other domains of life and enhance pathways and agency thinking. Performance at the workplace is thus expected to impact hope and mental health positively.

The current study accordingly incorporated this interactional view into a model with reciprocal effects and combined performance measures from practical exams with self-reported hope and general mental health over a timeframe of 24 months (see Table 7). In order to differentiate effects of hope from effects solely related to general healthy functioning, the effects of hope were controlled for mental health, and the relation between general mental health and competence was also investigated.

Table 7

Design of study, different time points of measurement (T1-T4) and sources of data

	T1	T2	T3	T4
Month in study	1	9	21	24
Stage in Training*	Year 2, June	Year 3, March	Year 4, March	Year 4, June
Data source	Survey Wave 1	Survey Wave 1	Survey Wave 2	registry of state departments for vocational education
Measures	Mid training exam grade	Hope, general mental health	Hope, general mental health	Final exam grade

Note. *Vocational school starts in August and ends in June. Training on the job is year-round.

Research Question 1: Relation between Hope and Competence

Based on the theoretical reflections a reciprocal relation between hope and competence is assumed.

Hypothesis 1a: Hope (T3) is positively related to the performance (final grade three months later at T4), after controlling for prior achievement (mid training grade at T1).

Hypothesis 1b: The performance (mid training grade at T1) is positively related to hope (nine months later at T2).

Research Question 2: Relation between Hope and General Mental Health

In order to the test the hypothesis of reciprocal influence of hope and general mental health the reciprocal relation is analyzed over a one year time frame.

Hypothesis 2a: Hope at T2 has a positive influence on general mental health (at T3 one year later).

Hypothesis 2b: General mental health (at T2) has a positive influence on hope (at T3 one year later).

Research Question 3: Relation between General Mental Health and Competence

Being mentally healthy should coincide with better adjustment, better functioning, and increased attendance at work, which should also facilitate the development of competencies during vocational training.

Hypothesis 3a: General Mental Health (at T3) has a positive influence on competency (final grade three months later at T4), after controlling for prior achievement.

Hypothesis 3b: Competency (in the middle of training at T1) has a positive influence on general mental health (nine months later at T2).

Method

Sample

The data were obtained as part of a larger study founded by the Swiss Department of Vocational Training and Technology. The sample consisted of German-speaking Swiss polymechanic apprentices (i.e., they work three to four days a week at mostly private companies and attend vocational schools for the rest of the week). The vocational training to become a polymechanic lasts four years, with exams at the end of the second year and fourth year. The present analysis was based on two cohorts of trainees for which the final grade at the end of their training was known (N = 318). The trainees had an average age of 19.97 years (SD = 1.20) in the last year of their training, 90.1% were native German speakers and 96.5% male. There were no statistically significant differences associated with gender or native language in the used trainee variables. The selected trainees were in the third or fourth year of the training at the first of two waves of measurement. Since the research interest lied in the development over the years in the vocational training, the metric of time chosen in the present analysis was the year of training. The data was restructured accordingly and as a result a cohort-sequential design permitted to link the period from the mid training exams to the final exams. Most coefficients are based on both cohorts, except the estimates for the coefficients related to the constructs hope and general mental health in the third year are based on one cohort. The variables used in the model were tested for differences across the cohorts. General mental health, hope and the final grade did not differ statistically significantly. Only for the mid training grade occurred a significant difference ($t(270) = 4.32$, $p < .001$): the cohort of the first wave had a higher mid training grade (M = 4.93, SD = .40) than the cohort of the second wave (M = 4.71, SD = .40).

Design and Procedure

The data were obtained at four different points in time (see Table 1). The mid training grade resulted from the exams at the end of the 2nd year in June (T1). The measures of hope and general mental health were assessed in March of the 3rd year (T2) and in March of the 4th year (T3). The participating trainees filled out a paper and pencil or an online version of the questionnaire during work hours. The final exam took place in June of the 4th year (T4).

Measures

Hope. A previously tested German version of the Adult Dispositional Hope Scale (Snyder et al., 1991) was used. The participants answered the eight items of the hope scale on a 6-point Likert-type scale ranging from 1 (definitely false) to 6 (definitely true). The overarching hope construct consists of two subscales with four items each: pathways or ways (ex. "Even when others get discouraged, I know I can find a way to solve the problem.") and agency or will (ex. "I energetically pursue my goals."). Snyder et al. (2002) report Cronbach's α ranging from .74 to .78 across multiple independent samples (Snyder et al., 1991). In the present study, the internal consistency for the dispositional Hope Scale was satisfactory (α year 3 = .74, α year 4 = .78).

General mental health. The General Health Questionnaire (GHQ-12) (Goldberg, 1972) was used to assess general mental health. A sample item is, "Have you recently been able to enjoy your normal day-to-day activities?" Items were scored on a 4-point Likert scale using anchors that originally ranged from 1 (better than usual) to 4 (much worse than usual). In order to make the interpretation of the scale more intuitive, the coding was reversed, so that high values correspond to better mental health. Some items loaded very low on the general mental health factor. To estimate the latent factor of general mental health only 4 items with high lambda

values and no indication for correlated errors were retained. The reliability of these four items was satisfying (α year 3 = .79, α year 4 = .80).

Competency measures. A long tradition exists within dual vocational training systems to test vocational skills and knowledge with complex work tasks, which is considered as an approach of high quality (Breuer, 2006). During the polymechanical training the mid training exams at the end of the second year (T1) and the final exams at end of the fourth year (T4) are such important assessments of practical vocational competencies, as well as professional and general knowledge. The mid training exam tests the mastery of basic skills and the subject matter of the first two years. The final exam tests the overall proficiency as a professional, includes also a large individual practical project, and determines if the individual is granted the professional certification. Both exams therefore have a high external validity. The grades range from 1 (very poor) to 6 (very good). Grades below 4 (satisfactory) are the unsatisfactory grades, and will not be sufficient to obtain the professional certification. For both exams the total grade was used as competency indicator. The final examinations take place at the vocational schools with experts evaluating the trainees' practical performance. The exams are conducted at state level, but the used curriculum and guidelines are federal. The final grades are therefore supposed to reflect the same vocational competencies. They are however not the result of a nationwide psychometrically standardized test. There was no significant difference in mean levels of the grades due to states. Two analyses of the variance components with states as the random factor indicated that for the final grade no variance was associated with the states, and for the mid training grade about 2.5% of the variance was associated with the state level. Both grades were collected from the records of the different states' vocational training departments. The officially reported mid training grade and the self-reported mid training grade

correlated with $r = .97$. The self-reported measures were thus highly trustworthy and because the self-report grades were more prevalent, the self-reported data were used as indicators for the mid training grade. The final grades were only based on information from state departments for vocational training, since the final exam took place three months after the last survey.

Missing Data

In longitudinal modeling missing data from a subject can be partially missing at a particular wave of assessment or all the items from a particular wave could be missing. The analysis reported in this study uses the full information maximum likelihood procedure to deal with missing data (Enders & Bandalos, 2002). Model parameters and standard errors are estimated directly from the available data. Missing data points are not estimated or imputed, and are essentially treated as values that were never intended to be sampled. Schafer and Graham (2002) report that for large enough samples ($N > 250$), maximum likelihood estimation and the multiple imputation methods are very similar and equally effective.

Statistical Analyses

In order to examine the reciprocal effects among hope, general mental health and competency an autoregressive cross-lagged models was specified. The structural equation model was estimated using AMOS 6.0 (Arbuckle, 2005). The model includes the latent constructs hope and general mental health in the 3rd and 4th year of training. The indicators for competency were the grades at the end of the second year and at the end of the fourth year. When a flexible view of personality is adopted, temporal instability can reflect either true psychological change or measurement error (Watson, 2004). The measurement model was explicitly modeled to correct the latent constructs for measurement error. Although autoregressive cross-lagged models are widely used, the statistical assumptions underlying these models have

been subject to criticism (Rogosa, 1995). One critique is that autoregressive models assume fixed effects for all individual units under investigation and reflects group changes only. Another critique asserts that these models do not account for absolute changes in individual scores for a construct of interest.

Measurement model. Hope and general mental health were treated as latent factors with four indicators for general mental health and four parcels for hope. The eight indicators for hope were reduced to four parcels, in order to obtain a more parsimonious model, because the structural paths between latent variables were of more interest than the measurement model and the individual items (Little, Cunningham, Shahar, & Widaman, 2002). Although hope is used as a construct with a single dimension, the method of Kishton and Widaman (1994) was followed to balance out the agency and pathways components. Following this approach, for each parcel, an item from the agency and pathways component was randomly chosen. The marker variable method has been used to identify the model. That is, for each construct, one randomly-selected factor loading was set to one. In all models the measurement errors of the same indicators at different measurement waves were allowed to covary (Little, Preacher, Selig, & Card, 2007). The primary criterion for panel models is that they demonstrate weak factorial invariance, the fundamental meaning of the constructs is stable over time and respective indicators represent the same construct over time (i.e., the structure of the models and relative loadings of the factors do not differ) (Little et al., 2007). To test for weak factorial invariance, the factor structure of all the constructs was specified in the same way for the two waves. This model was then compared to a model with equality constraints of the factor loadings of the same indicator across time. The overall fit of the model with the factor loadings set equal for the constructs across time points was satisfactory (χ^2 = 144.56, df = 124, p = .10, χ^2/df = 1.17, *RMSEA* = .02, *CFI* = .98, *TLI* = .98) and did

not fit the data significantly worse (χ^2-difference = 1.73, *df* = 6, *p* = .94) than the model with free factor loadings for the constructs across the two time points (χ^2 = 142.84, *df* = 118, *p* = .06, χ^2/df = 1.21, *RMSEA* = .03, *CFI* = .98, *TLI* = .97), thus fulfilling the most basic prerequisite for longitudinal modeling (Little et al., 2007).

Results

Descriptive Analyses

Means, standard deviations and correlations. The means, standard deviations and correlations for the manifest variables hope, general mental health, the mid training grade and the final grade are documented in Table 8. All the constructs were clearly above their theoretical midpoints. Hope and general mental health remained at similar levels with a minimal declining tendency. The mid training and final grade had the same mean, slightly below the grade of 5 (good).

Table 8

Means, standard deviations and correlations of the manifest variables hope, general mental health (GHQ), mid training grade, and final grade

	Variable	N	M	SD	1	2	3	4	5
1	Hope Year 3 (T2)	103	4.81	0.50					
2	Hope Year 4 (T3)	314	4.75	0.58	0.55**				
3	GHQ Year 3 (T2)	102	3.34	0.56	0.33**	0.19			
4	GHQ Year 4 (T3)	316	3.30	0.58	0.11	0.24***	0.20*		
5	Mid training Grade (T1)	301	4.80	0.42	0.05	0.05	0.15	0.12*	
6	Final Grade (T4)	318	4.80	0.35	0.11***	0.20***	0.21*	0.19***	0.69***

Note. * p < .05. ** p < .01. *** p < .001.

Stability of hope and general mental health. After the examination of the measurement models (see Method section), the structural paths were modelled (see Figure 1). First, an autoregressive path was introduced between the measurements of hope at time 1 and time 2 in order to account for the temporal stability of hope over time. The corresponding path was also introduced for general mental health. Autoregressive paths are generally seen to represent how stable a construct is from one time point to the next, because they indicate the degree to which the individuals' relative rank order changes (e.g., Finkel, 1995). They are thus referred to as stability coefficients. As mentioned earlier, the stability coefficients do not bear information about individual change in absolute scores across different points in time. Additionally, the residuals of corresponding indicators were allowed to correlate across measurements to account for variations due to disturbances specific to the item (Little et al., 2007). Hope in year 3 predicted hope in year 4 with $\beta = .71$ ($p < .001$), indicating a rather high stability in rank order over one year. On the other hand general mental health in year 3 predicted general mental health in year 4 with $\beta = .33$ ($p < .05$), indicating that the rank order in general mental health changed more than the rank order in hope. General mental health was thus a lot less stable over the investigated timeframe than hope.

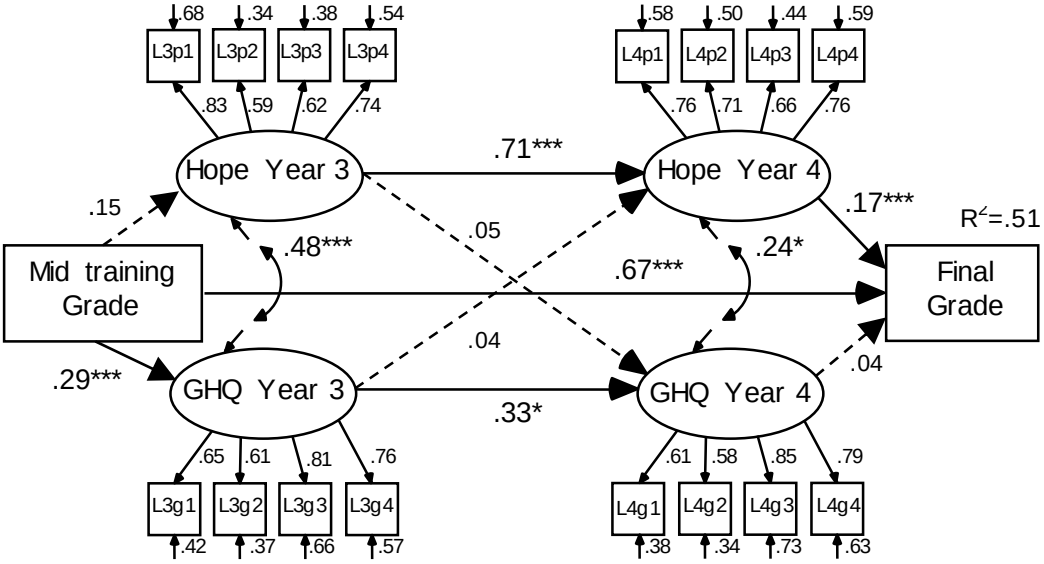

Figure 6. Latent autoregressive cross-lagged model for hope, general mental health (GHQ), mid training grade, and final grade. All regressions coefficients are standardized. Bold paths represent statistically significant coefficients. Dotted paths indicate modelled, but non-significant coefficients. Double headed arrows represent correlations between residuals. Measurement errors of corresponding indicators were allowed to correlate freely over time, but are not displayed in the figure. Factor loadings of respective indicators were set equal across both time points. *Note*. * $p < .05$. ** $p < .01$. *** $p < .001$.

Research Question 1: Relation between Hope and Competence

The final grade was well predicted ($\beta = .67$, $p < .001$) by prior competency level (mid training grade). After controlling for this prior level of competency, hope in year 4 (about three months before the final exams) was also a statistically significant predictor ($\beta = .17$, $p < .001$) of the final grade. The 49% of the variation in the final grade explained simply by prior achievement was increased to 51% by adding hope to the predictors. Hope as a unique predictor explained 7% of the variation in final grade. Thus hypothesis 1a, which claimed that hope was a predictor of the competency level at the end of training, was supported. The path from the mid training grade to hope in year 3 was only marginally statistically significant ($\beta = .15$,

p = .07), the hypothesized positive effect of performance on hope (hypothesis 1b) could thus not be clearly supported over this 9 month period.

Research Question 2: Relation between Hope and General Mental Health

In order to reflect the reciprocal influences of hope and general mental health two cross-lagged paths were introduced (see Figure 1). These cross-lagged coefficients informed about the structural relationships between the two constructs. Because the influence of prior time points of the same construct were accounted for by the autoregressive paths, the cross-lagged effects indicated the separate influence of the other construct and were aimed at explaining changes in the other construct. The cross-lagged effects were not significantly different from zero. Thus, hope and general mental health did not predict each others change and the hypotheses 2a and 2b could not be supported. The residuals of the constructs were allowed to correlate in order to reflect variation not accounted for by variables from earlier time points. The correlation in year 3 (r = .48, p < .001) indicated a substantial synchronous relation, which was about half the size in year 4 (r = .24, p < .05).

Research Question 3: Effects of Performance on Hope and General Mental Health

General mental health was not a statistically significant predictor of the competency level at the end of training. Hence, the effect of mental health on performance (hypothesis 3a) was not supported. However, the mid training grade was a statistically significant predictor of general mental health nine months later (β = .29, p < .001), thus supporting hypothesis 3b.

Discussion

The longitudinal data permitted the present study to investigate how hope, mental health and vocational competency interrelate over time within the context of

vocational training. The empirical results only partially supported the hypothesized resource model.

The influence of hope on the final grade at the end of the vocational training highlighted the impact hope can have on competency development in VET, especially since the effect on the final level of competency was controlled for the level of competency attained at the middle of training. The finding thus confirms the effect of hope on academic achievement (Curry et al., 1997) and performance at the workplace (Peterson & Byron, 2008).

Hope theory clearly states that hope is nurtured by experiences of successful goal pursuit (Feldman, Rand, & Kahle-Wrobleski, 2009; Snyder, 2002). It was therefore surprising that the positive effects of the mid training grade on hope were only of marginal statistical significance. Since individuals constantly received new feedback in regard to their numerous goal pursuits the effects of the performance at exams could have worn off after the substantial time lag of nine months. Investigations with shorter timeframes and multiple measurements should be able to clarify how strong short-term feedback effects from vocational competence on hope levels are.

The hypothesized positive reciprocal relationships between hope and mental health were not confirmed over a twelve months time lag. However, the considerable synchronous relationships between hope and general mental health could be a sign that reciprocal effects between hope and mental health potentially take place within shorter timeframes. Shorter intervals of measurement with the inclusion of state hope measures would give clearer indications of the temporal dynamic of the effects. For example, Avey et al. (2010) had found small but significant predictions in change of the GHQ by PsyCap over a shorter period of three months.

The significant positive relation of the performance at the mid training exams with mental health nine months later is an indicator for the importance of performance and development of vocational competencies at the workplace for the general mental health of vocational trainees. However, the present design did not allow for interfering causal relations and the underlying mechanisms are likely more complex. One possibility is a third variable influencing both performance as well as mental health. For example, socioeconomic background is a variable associated with mental health and academic performance (e.g., Costello, Compton, Keeler, & Angold, 2003). Because the hypothesis, that mental health is related to latter performance, could not be supported, it seems more likely that mental health is a result of performance rather than a cause for it.

Strengths, limitations and future research

The length of the investigated timeframe and the multiple measurement waves made the investigation of longitudinal effects beyond the limitations of cross-sectional data possible (i.e., questions of directionality and reciprocity). However, since the analysis is based on an accelerated or cohort-sequential design (the hope and mental health scores at T3 were not available for one cohort) potential problems of this method also apply to the present analysis (e.g., the combination of the information obtained from the two cohorts could be problematic, if the two cohorts would be substantially different in variables for which we were not able to examine non-difference). Although longitudinal cross-lagged models have a considerably stronger position to make causal arguments than models based on cross-sectional data, they do not have the strength of experimental data. Key threats to causal inferences include the exogeneity assumption, the omitted variable problem, and potential confounding of instrumental variables (Little et al., 2007). The true causal agent could be due to events antecedent to the study. Similarly, omitted variables

could be the true causal agents leading to covariation giving the appearance of causality. For example, it is likely that the initial level of hope upon entering the training influences latter levels of hope, mental health, and achievement. In order to shed more light on the specific nature of the reciprocal effects, future studies should consider adopting a similar time horizon, but with more measurement waves in order to narrow down effects and explore the processes and dynamics of hopeful thinking. Besides investigating trait hope, future research would possibly benefit from the inclusion of state hope to capture the more short term dynamics of reciprocal effects with performance and mental health. Feedback from performances could have short term effects (e.g., several weeks) on state hope and more lasting effects on hope in general. An additional strength of the longitudinal data is the availability of information about competency levels at different time points during the training, which permits to narrow down the effects of hope more precisely.

When using hope as a construct to predict performance a potential fallacy of circular reasoning, which is rarely mentioned, should be considered. Potentially problematic is a conceptual and measurement issue: some of the hope items for the agency component focus on prior successes (e.g., I've been pretty successful in life; I meet the goals that I set for myself). Predicting performance with hope could thus be viewed as using a self-reported holistic evaluation of prior performance as indicator to predict present or future performance. This problem however is diminished by the considerable broadening of the meaning of the construct hope through other agency and pathways items.

The large, real-world sample suggests a strong ecological validity. However, the sample is limited to mostly male Swiss German-speaking polymechanic trainees. Replication of the results within another profession, other age group and with more

female participant would further support the generality of the underlying psychological processes.

Conclusion

In the introduction we suggested, that VET should, besides developing vocational competencies, also foster personal resources and mental health in order to prepare trainees for future workplace demands. The proposed resource model, where hope, mental health and vocational competencies are interacting personal resources could only be partially supported. This study provided initial theoretical and empirical support for the hypothesis that hope is an important personal psychological resource for the development of vocational competency during VET. Even after controlling for the vocational competency level at mid training and mental health three month before the final exams, trainees' hope can have a positive effect on the attained competency level at the end of the training. Consequently, the present study would advise organizations to specifically foster hope as a character strength. By doing so the organizations would not only strengthen the trainees' resources to deal with future challenges during their work life, but ultimately also promote mental health, because of the positive effect of vocational competency on mental health.

Although the positive impact of vocational competencies on hope could only be marginally supported over the investigated nine month timeframe, the considerable theoretical argument still makes it plausible to assume that VET can have a positive impact on trainees' general hope with its core business of developing vocational competencies. Organizations can consider to enhance hope with targeted interventions (e.g., Lopez, Rose, Robinson, Marques, & Pais Reibero, 2009; Lopez et al., 2004) or by creating a hope fostering learning environment and a corresponding organizational culture.

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General Discussion

Integration and overview of the three Studies

The development of hope – Integrating study 1 and 2

The first two studies addressed the development of hope in the context of the workplace.

In the first study (see Table 9) the theoretical basis was outlined and the main hypotheses were tested with cross-sectional data. The collected data stemmed from trainees and their trainers. Each trainer worked with a group of trainees. It was thus possible to assess the characteristics of the environment based on three sources of data: the individual, the average of a trainee group, and the rating of an individual trainer. For this purpose the data were analyzed with multilevel analyses, which take into account the nested data structure (individual and group level). The hypotheses were that the three basic psychological needs of self-determination theory (SDT; Deci & Ryan, 1985) are positively related to hope. The hypotheses were confirmed for all three needs with the individual data and with the aggregated trainee data, when not controlling for individual level variables. The trainer information about the basic psychological needs did not relate to the individuals' hope.

Study 1 thus provided indication that the basic psychological needs are related to hope, but also indicated that the perception and perspective matters. Furthermore, study 1 provided another indication, that work environments do play a role in the development of hope: about 11% of the variance of hope was associated with the group of trainees a trainee was in.

Table 9.
Overview Study 1: Hope and self-determination

Research question	Hypothesis 1: The three indicators of basic need satisfaction relate positively to hope. Hypothesis 2: Because of the universal nature of SDT, the relationships between the basic needs and hope do not vary across groups of trainees. Hypothesis 3a: The averages of need satisfaction of trainees grouped by their trainer relate positively to individual levels of hope. Hypothesis 3b: Information from trainers about need satisfaction relates positively to individual levels of hope.
Sample	450 trainees from all 4 years of training at wave 1 58 trainers
Method	Cross sectional questionnaire study with from a trainee and a related trainer sample Hierarchical linear models
Measures	Adult Dispositional Hope Scale (Snyder et al., 1991) Basic psychological needs: Relatedness (Baeriswyl, Wandeler, & Oswald, 2006), Autonomy (Scharnhorst et al. 2006), Competence (Frey & Balzer, 2005)
Results	H 1, 2 and 3a supported H 3b not supported

While study 1 confirmed the relations between the satisfaction of basic psychological needs and hope, the directionality and long term relations were not testable with the available data. Study 2 (see Table 10) was a longitudinal study based on three measurement waves which enabled the investigation of hypothesized reciprocal causal relations.

Because of the nature of the context, i.e. the aim of vocational training to influence and shape an individual, it is more apparent to assume an influence of the

context on the individual. But the other causal directionality is plausible: high hope people may perceive an environment in a more positive way or actually interact with their environment and shape it in ways which lead to modified conditions with higher need satisfaction. The autoregressive models revealed that there is a longitudinal relation over time between competence and hope. Relatedness and autonomy did not show any positive relations over the investigated one year timeframes. However, relatedness and autonomy are correlated with hope at each point in time potentially indicating a more situational relation.

Table 10.
Overview Study 2: The development of hope at the workplace

Research question	Hypothesis 1: Hope will demonstrate higher stability over the three years of the present study than the psychological needs; however, the degree of stability of hope will be lower than has been documented in previous research covering hope over shorter time frames. Hypotheses 2: Competency (2a) / Autonomy (2b) / Relatedness (2c) each has a positive influence on hope one year later. Hypotheses 3: Hope has a positive influence on competency (3a) / autonomy (3b) / relatedness (3c) one year later.
Sample	414 trainees from 1 cohort at years 1, 2, and 3
Method	Longitudinal questionnaire study with 3 measurement points Structural equation models
Measures	Adult Dispositional Hope Scale (Snyder et al., 1991) Basic psychological needs Relatedness (Baeriswyl, Wandeler, & Oswald, 2006), Autonomy Scharnhorst et al. (2006), Competence (Frey & Balzer, 2005)
Results	H 1, 2a and 3a supported H 2b, 2c, 3b, 3c not supported

In study 1 perceived competence had the strongest relation with hope. The dynamics of this relation were shown to be reciprocal in study 2. Hope and competence influenced each other over time. The results of study 2 therefore suggest

that for the promotion of hope the need for competence is the most important need to be satisfied. The relations between hope and the satisfaction of the need for relatedness and autonomy seem to be more situational. There was a marginal tendency for hope to precede the satisfaction of relatedness and autonomy, potentially indicating the beneficial effects of hope on the shaping of future situations (or the perception thereof). Nevertheless the needs for relatedness and autonomy are theoretically intertwined with the need for competency and are essential elements of a nurturing learning climate.

Integrating the developmental insights of study 1 and 2 with outcomes

Study 3 (see Table 11) investigated the relation between hope, mental health, and performance. A positive resource model was developed. It not only assumed positive influences of hope on mental health and performance, but also expected positive feedback influences from performance and mental health on hope. Hope was associated with higher performance, even when controlling for earlier performance. However, the data did not provide support for the hypothesized direct reciprocal effects between hope and mental health over a one year timeframe. The relation between hope and mental health could be mediated by performance. Hope positively predicted the performance at work and performance in turn positively predicted mental health.

After linking hope to positive outcomes like performance and mental health, the integration of the results of study 1 and study 2 about the development of hope, would suggest that creating an environment favorable to the development of hope should ultimately also benefit performance and indirectly mental health. SDT has been linked to positive health outcomes and specific performance outcomes (Ryan & Deci, 2000). SDT would therefore be suited to function as a macro theory for the promotion of hope, performance, and mental health.

Table 11.
Overview Study 3: Hope, mental health and development of vocational competencies at the workplace

Research question	Hypothesis 1a: Hope in year 3 (T2) has a positive influence on general mental health in year 4 (T3). Hypothesis 1b: General mental health in year 3 (T2) has a positive influence on hope in year 4 (T3). Hypothesis 2a: Hope in year 4 (T3) has a positive influence on the final performance (final grade) three months later (T4), after controlling for prior achievement. Hypothesis 2b: General mental health in year 4 (T3) has a positive influence on the final performance (final grade) three months later (T4), after controlling for prior achievement. Hypothesis 3a: The performance in the middle of training (midtraining grade) (T1) has a positive influence on hope (T2) nine months later. Hypothesis 3b: The performance in the middle of training (midtraining grade) (T1) has a positive influence on general mental health (T2) nine months later.
Sample	318 trainees from 3rd and 4th year from 2 cohorts
Method	Longitudinal questionnaire study with 4 measurement points Structural equation models
Measures	Adult Dispositional Hope Scale (Snyder et al., 1991) General Health Questionnaire (GHQ-12) (Goldberg, 1972 Performance measures (Midtraining and Final grades)
Results	H 2a and 3b supported H 1a, 1b, 2b and 3a not supported

Theoretical and empirical implications for hope research

Development of hope – characteristics of environments

The present dissertation had to extend hope theory in order to establish a theoretical basis for the investigation of the development of hope in a work environment. Favorable characteristics of workplace environments for the development of hope where theoretically identified. Largely based on SDT (Deci & Ryan, 1985) the idea was formulated that the satisfaction of basic psychological needs is essential for the development of hope. The combination of hope theory with SDT has been theoretically highly fruitful and the empirical results for the workplace were rather supportive.

The present studies are a first step and open up a variety of new research questions by contributing a first analysis of characteristics of environments in regard to their relation to hope and their influence on the development of hope. For the further inclusion of SDT in hope theory it would be important to empirically test the theory in various contexts (e.g., different work environments, schools, elderly homes). Besides examining the generalizability of the results, also a deeper understanding of the involved processes would be desirable. For instance, hope is about overcoming difficulties and hindrances, so hope could actually function as a buffer against the lack of satisfaction of the basic psychological needs. Hopeful individuals could have ways of framing contexts in order to feel and become more satisfied. Ryan and Deci (2000) emphasize the universality of the needs and decline to view individuals as having different strengths of needs. However, theoretically it seems plausible, that people with very low hope can be overwhelmed by a situation which offers a lot of autonomy. Depending on individuals levels of hope they might benefit differently.

The empirical relation between hope and the need for competence supports the theoretical analysis that the components of hope –agency and pathways– could also considered to be a basic psychological need similar to the need for competence. Hope focuses on having solutions available, having knowledge and know-how. Hope is thus the availability of resources, or the ability to generate resources in the face of a problem. Hope is closely related to competences and encompasses the competency to develop new competencies. The present dissertation suggests that the work place can be important for promoting hope, particularly for young adults.

The needs for relatedness and autonomy did not appear to have long term effects, but short-term effects seem possible, due to the correlation. Therefore a more situational investigation and the examination of state hope would be meaningful. For example the satisfaction of the different needs could be varied experimentally in different situations the influences on state hope could be evaluated. These situational processes are probably a key element of a hope promoting learning and working environment. It is therefore essential for hope theory to examine situational dynamics, while combining this research with further investigations of the long-term effects.

The motives behind goal pursuit have been theoretically discussed to be an important characteristic of hopeful thinking. Motives are hardly addressed by hope theory. Although the present dissertation did not investigate motives empirically, it has provided a theoretical rationale to empirically investigate the relation between hope and goal motives more closely within hope research. An important next step in bridging HT and SDT would thus be to investigate if self-concordant goals are related to higher levels of hope.

Another question is how people develop hope despite very adverse conditions? Also analyzing environments which produced high hope individuals

could provide further characteristics of hope promoting environments. Learning from extreme cases could add to the knowledge about beneficial and harmful characteristics of environments, and to which degree individual and environmental characteristics contribute to the development of hope.

Hope and health

Hope research has examined the relation between mental health and hope mostly with correlative studies or with hope as a predictor of mental health. In study three the relation between hope and mental health over one year was examined in more detail and contrary to the expectations no relations were found over a one year time lag. While the hypothesis that mental health influences hope was new —and reflects the theoretical interactive relation— the previously reported influence of hope on mental health could not be confirmed. Hope research would really benefit from examining the health related processes more thoroughly. It would clarify to which degree hope is an indicator of mental health or if hope is a long-term predictor of mental health. The increase in hope has been seen as one of the major beneficial effects of modern society, comparable to elementary advancements in medicine (Snyder & Feldman, 2000). If hope causes health, it could have great implications for public health and policy making; i.e., hope interventions and redesigning work environments to promote hope could be suggested to enhance mental health.

An example for the challenges of providing strong evidence for causality is documented in a discussion about a meta-analytic review suggesting that optimism —a construct related to hope— is a significant predictor of positive physical health (Rasmussen, Scheier, & Greenhouse, 2009). Not only is the notion of optimism as a predictor challenged, but even the reported association to health is questioned by a critical comment on the review (Roseman, Milette, Zhao, & Thombs, 2010), which in turn is again discussed by the authors of the meta-analytic review (Scheier,

Greenhouse, & Rasmussen, 2010). These discussions show the benefits of an open research process and point to the importance that small details of routine research work and procedure per se are important (the argument seems to get hung up on these procedural questions). However, accurately conducting the best identified procedure is a prerequisite for a more fundamental discussion of research in the light of theory, logic, and philosophy of science, which are elementary to knowledge creation, especially when aspiring to draw causal inferences (e.g., Cook & Campbell, 1979). Like all research future hope research will benefit from using the best available designs and methods in order to obtain results which provide strong results.

Hope, performance and competency development

First of all it is noteworthy, that the used performance measures reflect job or vocational success and therefore are a realistic measure of adjustment to the current and future working environments, on the contrary to school grades (e.g., McClelland, 1973). The present study thus adds further empirical support for the relation of hope with performance and in a broader sense life adjustment. The study provides a novel contribution by examining how hope is influencing competency development.

Study 3 has argued that controlling for prior levels of performance is particularly important in order to better isolate effects of hope. Future research should try to not only measure performance but actually look at the development of performance. It would also be crucial to control for earlier levels of hope. By controlling for earlier performance and hope levels the conclusions are more precise and trustworthy, because the confounding of hope and performance is minimized.

However, the present research found only marginally significant effects of influence of prior performance on hope, which suggests that the degree of confounding is not enormous. It thus still remains an important question for hope research to examine the effects between hope and performance. Longitudinal studies

with numerous sequential measures of trait hope, state hope, and clear performance measures and performance feedback would allow investigating these feedback processes. Hope theory has hypotheses about emotional and cognitive processes of feedback which could be tested in more detail.

Hope theory would also need to gain knowledge when performance impacts hope. For instance if a person cares a lot about work, the impact of work performance on general hope will be great, if a person does not feel personally invested with their work the impact will be low. How experiences in certain domains are weighed in their influences on general hope is still unclear. This could be important though. When conducting hope interventions, policy makers or enterprises could target work or life domains which are particularly influential on hope development. If for instance work is an important domain and work experiences have a profound influence on hope levels, then resources should be invested in making work experiences as beneficial as possible. If on the other hand experiences in sports, music, social encounters etc. also have beneficial effects, the suggestion would be to facilitate experiences in these areas as well. It is likely that numerous life domains influence hope, depending on the individuals and stage of life. Similarly the effect that hope has on performance probably varies with the investigated tasks. Routine jobs with low performance demands probably need less hopeful thinking, whereas demanding jobs which breach new boarders need very hopeful individuals.

The research methods and designs necessary to answer these kinds of research questions would clearly be challenging, but here hope research can benefit form general psychological research experiences.

Relevance for research in general and positive psychology

Integrating the present dissertation with the broader psychological research is probably done best in the light of its contributions to positive psychology research, since hope research has been an early part of the movement.

The dissertation touched some of the challenges of positive psychology discussed 10 years ago Seligman and Csikszentmihalyi (2000): e.g., developmental aspects of positive traits, possible buffering effects of positive traits, emergence of positive institutions (positive workplaces), and transition from descriptive to prescriptive. The analysis of positive outcomes, the attempt to identify environments which support the development of positive traits, and the suggestions for practical applications contributed to positive psychology becoming more prescriptive, based on empirical results not normative axioms. Also these studies have suggested that hope and its effects are desirable outcomes, while additional steps were contributed in the process of identifying positive, hope promoting work environments.

Cowen and Kilmer (2002) had discussed some strengths and limitations of positive psychology. As main limitations they identified a relative insulation from closely related prior work in primary prevention and wellness enhancement; a lack of a cohesive undergirding theoretical framework; and a prime adult, cross-sectional approach, which does not sufficiently reflect key life history and developmental pathways and determinants of specific positive outcomes. Since 2002 positive psychology research has made a great deal of advance and addressed a lot of these issues. The current dissertation also worked towards a reduction of the main limitations.

First, with the inclusion of SDT a cohesive underlying theoretical framework which is well established in general psychology was adopted.

Second, the investigated sample of young adults broadened the usual samples.

Third, the investigation of young professionals mirrors the larger portion of Swiss youth and goes beyond the customary convenience sample of (psychology) students.

Fourth, the study 2 and 3 went beyond cross-sectional analyses and investigated longitudinal developments.

Fifth, study 1 and 2 addressed environments as determinants of hope as a positive outcome. However, while the theoretical body was well connected to prior existing work in organizational and work psychology, the connections to research in primary prevention could have been more punctuated.

A useful contribution for positive psychology research in general is the additional theoretical and empirical knowledge in regard to the use of SDT. The inclusion of SDT itself has already been suggested early on by Ryan and Deci (2000) in the special issue of the American Psychologist about positive psychology, which is often cited as starting point of the movement (Seligman & Csikszentmihalyi, 2000). Deci and Vansteenkiste (2004) again suggested to use SDT as an active-organism meta-theory and discussed the benefits for positive psychology.

The present study found empirical indications that SDT would probably suit as a macro-theory like Deci and Vansteenkiste (2004) suggested, and would be a step towards establishing the undergirding theoretical framework deemed lacking by Cowen and Kilmer (2002).

The characteristics of environments described as nurturing human potentials by SDT could also be beneficial for analysis of the development of other character strengths. Thus positive psychological research would benefit from examining these environmental aspects in more detail. It is likely that some character strengths are not only nurtured by the three basic needs as a whole, but specifically by the satisfaction of a particular need. For example love, trust and forgiveness are likely to flourish in

an environment which satisfies the need for relatedness. Besides character strengths also other existing research in positive psychology like the research about flourishing, happiness, and well-being could benefit.

Practical implications

The practical implications of the present dissertation concern two main areas: the beneficial aspects of hope and the promotion of hope. The recommendations are based on the data obtained from young adults in the context of vocational training at enterprises. However, the suggestions should also pertain to later stages in the work life, because the underlying theory is a general theory of human development and functioning. However, the universal effects across age groups and work life would have to be empirically validated.

Study 1 concluded that individual hope is influenced by the workplace and the satisfaction of all the basic psychological needs can positively impact hope. Companies should strive to create enduring favorable conditions at the workplace which satisfy the all the basic psychological needs.

Study 2 identified longitudinal effects between hope and competence, while autonomy and relatedness had only very weak longitudinal effects. Thus, satisfying the need for competence appears to be the most powerful way for workplaces to promote hope in the long run and thus foster psychological resources. Feeling more competent in the chosen profession is a practical way to nurture the character strength hope. Although the potential positive influence of work on the development of personality is hardly new to researchers and practitioners (e.g., Kohn & Schooler, 1983), the empirical demonstration of the long term impact of the subjective perception of competence on hope one year later should encourage enterprises and trainers to structure the training more in ways which provide opportunities for trainees to experience being competent and provide numerous experiences of

overcoming difficulties. The characteristics of such environments are also reflected in the idea of "developmental environments" (Raven, 2001) which facilitate the development of competence.

Although autonomy and relatedness did not have long-term impact on hope, the positive synchronous associations with hope nevertheless suggest that employees with leadership roles should strive to create work environments which facilitate the satisfaction of all basic psychological needs, and initiate and sustain positive situational and long-term feedback spirals.

Furthermore, the positive influences of hope on perceived competence and actual performance suggest that short term interventions to promote hope would have desirable outcomes, and should also spur interest in the development of other positive traits. In order to increase performance enterprises or vocational schools can conduct hope promoting interventions, which could also include trainers and vocational teachers to facilitate modeling behavior and instil a positive feedback spiral.

A main practical contribution of the present study would thus be, that not only short term interventions can be used to promote hope and lead to the subsequent positive effects: organizations as a whole can create hope fostering learning environments and organizational cultures.

Conclusion

The present studies have theoretically discussed how hope and self-determination theory come together in many ways, and found support for the relation between the satisfaction of the three basic psychological needs —competence, autonomy and relatedness— and hope. While autonomy and relatedness related synchronously to hope, indicating their potential importance for the creation of a hope nurturing atmosphere, the empirical findings support the notion of reciprocal

determination between hope and perceived competence over one year timeframes. Hope also positively predicted work performance at the end of the training. Performance in the middle of training in turn had positively predicted mental health. No direct reciprocal effects between hope and mental health were found over one year.

The particular importance of the need of competency for hope suggests that work can promote hope by offering the possibility to develop valued professional skills. Hope in turn can play an important role in the development of trainees' perception of their competencies as craftsmen and it is likely that hopeful individuals perceive their environments more favorable. The connection between an important character strength of young people and their work environment shows that the social context and the environment at work can substantially support the development of psychological strengths. Although this dissertation made only first steps in addressing the questions of causal order, the reciprocal feedback between individual and environment suggests that in practice one has the choice where to intervene in the feedback cycle, i.e., influence hope directly through interventions, or by creating favorable environments. Promoting hope should lead to increased performance and ultimately also to better mental health.

In regard to the future development of the hope construct, this study made the theoretical argument that outcomes probably do not only depend on how strong hopeful thinking is, but also to what kinds of goals hopeful thinking is directed to and how self-concordant these goals are.

References General Discussion

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Selbstständigkeitserklärung

zur wissenschaftlichen Arbeit an der Fachrichtung Persönlichkeitspsychologie und Diagnostik am Institut für Psychologie der Universität Zürich

Ich erkläre ausdrücklich, dass es sich bei der von mir eingereichten Dissertation mit dem Titel „The development of hope at the workplace" um eine von mir selbst und ohne unerlaubte Beihilfe sowie in eigenen W*orten* verfasste Originalarbeit handelt. Ich bestätige, dass die Arbeit als Ganzes oder in Teilen weder bereits einmal zur Abgeltung anderer Studienleistungen an der Universität Zürich oder an einer anderen Universität oder Ausbildungseinrichtung eingereicht worden ist noch zukünftig durch mein Zutun als Abgeltung einer weiteren Studienleistung eingereicht werden wird.

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Sanktionen

Ich nehme zur Kenntnis, dass Arbeiten, welche die Grundsätze der Selbstständigkeitserklärung verletzen – insbesondere solche, die Zitate oder Paraphrasen ohne Herkunftsangaben enthalten –, als Plagiat betrachtet werden und die entsprechenden rechtlichen und disziplinarischen Konsequenzen nach sich ziehen (gemäss §§ 7ff der Disziplinarordnung der Universität Zürich und Studienordnung der Universität Zürich).

Ich bestätige mit meiner Unterschrift die Richtigkeit dieser Angaben.

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